A Report on

BUSINESS INTELLIGENCE

HR ANALYTICS DASHBOARD FOR EMPLOYEE ATTRITION

Submitted in partial fulfilment of the requirements for the award of the Degree of

Bachelor of Engineering In

COMPUTER ENGINEERING

Submitted by

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DEPARTMENT OF COMPUTER ENGINEERING

(SVPM' COLLEGE OF ENGINEERING MALEGAON (BK), BARAMATI)

CERTIFICATE

This is certified that the following students have successfully carried out the B.E Business Intelligence project on HR analytics dashboard for employee attrition. This work is being submitted for the award of B.E. Computer Engineering Students

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(Guide)	(HOD)

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Wholehearted gratitude to our Business Intelligence project guide Prof. V.G.Jagtap For inspiration and guidance without which it would have been difficult for us to complete the Project. Last but not the least we would also like to thank the B.E. Department staff members, College Library.

Name of students :

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Gaikwad Gaurav Sanjay

Jagtap Prasad Maruti

Kadam Shubham Kundalik

ABSTRACT

The Employee attrition is a major concern for organizations as it leads to increased hiring costs, reduced productivity, and the potential loss of valuable knowledge. This project presents an interactive desktop application designed to analyze and visualize employee attrition data. Using advanced data visualization techniques and machine learning insights, the dashboard enables HR departments to make informed strategic decisions. The application identifies key factors contributing to employee turnover, such as job satisfaction, workload, salary, and work-life balance. By leveraging real-time data analysis, organizations can proactively address retention issues, enhance employee engagement, and optimize HR policies.

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1. INTRODUCTION

In today's competitive corporate world, retaining skilled employees is vital for sustained growth and stability. High attrition rates can significantly affect an organization’s performance and financials. Human Resource (HR) analytics plays a crucial role in understanding the patterns and causes of employee turnover. The primary goal of this project is to develop a user-friendly dashboard that provides actionable insights from employee data.

This desktop application serves as a powerful tool for HR managers by visually representing key metrics related to attrition. It integrates data analysis and visualization to deliver comprehensive insights into trends, correlations, and possible interventions.

2. RELATED WORK DONE

Visualization-based HR analytics has gained significant traction in recent years due to its ability to simplify complex data and enhance decision-making. Several organizations and researchers have explored visual tools to understand attrition patterns:

1. Microsoft Power BI for HR Analytics

   Many HR departments across industries use Power BI dashboards to visualize employee data, identify attrition trends, and monitor workforce demographics. Common features include heat maps of employee satisfaction, department-wise turnover rates, and comparison charts for tenured vs. new employees.

2. **HR Analytics in Corporate Settings**

   Companies such as Accenture and Deloitte have published whitepapers detailing the effectiveness of dashboard-based analytics tools (including Power BI) in reducing attrition by identifying at-risk employee segments visually.

3. PROBLEM STATEMENT

Organizations face a common challenge in understanding why employees leave and how to prevent it. Traditional methods of HR reporting are often reactive and fail to provide deep insights. The lack of real-time, data-driven tools limits strategic decision-making in workforce planning.

Problem:

How can we create an interactive, insightful, and easy-to-use HR dashboard that helps identify key factors behind employee attrition and aids in reducing turnover?

4. TOOL USED

The tools and technologies employed in your project are focused entirely on data visualization and dashboard design:

- **Microsoft Power BI**
  A powerful business analytics tool used to create interactive visualizations and dashboards. It allows real-time filtering, drill-downs, and report publishing.
- **Data Source**:
  - CSV datasets
  - The dataset includes fields like Age, Department, Job Role, Monthly Income, Job Satisfaction, Years at Company, and Attrition status.
- **Visual Elements in Power BI**:
  - **Bar Charts**: For comparing attrition across departments and job roles
  - **Pie/Donut Charts**: To represent attrition distribution by gender, marital status, or education field
  - **Stacked Column Charts**: To display multiple variables like job role vs. attrition with overlayed metrics
  - **Slicers/Filters**: To enable dynamic filtering by categories such as department, age group, or gender
  - **Line Charts**: To show attrition trends over time (if date fields are available)

5. SYSTEM IMPLEMENTATION

- **Data Collection**
  Obtained the *IBM HR Analytics Employee Attrition Dataset* containing features

Data Loading into Power BI

- Open Power BI Desktop.
- Click on **"Get Data"** → Select **Excel or CSV** → Import the HR dataset.
- Load the dataset into the Power BI data model.

Data Cleaning & Transformation (Power Query Editor)

- Handle any missing or blank values.
- Convert data types appropriately (e.g., numerical, categorical, date).
- Rename columns for clarity
- Create calculated columns or new measures if needed

Dashboard Design – Visualization Setup

Design a user-friendly and interactive dashboard layout by adding the visualizations.

Interactivity and Customization

- Add **drill-down features** to bar and column charts for deeper analysis.
- Apply **page-level and report-level filters** for better control.

Report Testing and Insights Extraction

- Test the dashboard with different filters to ensure all visuals respond correctly.

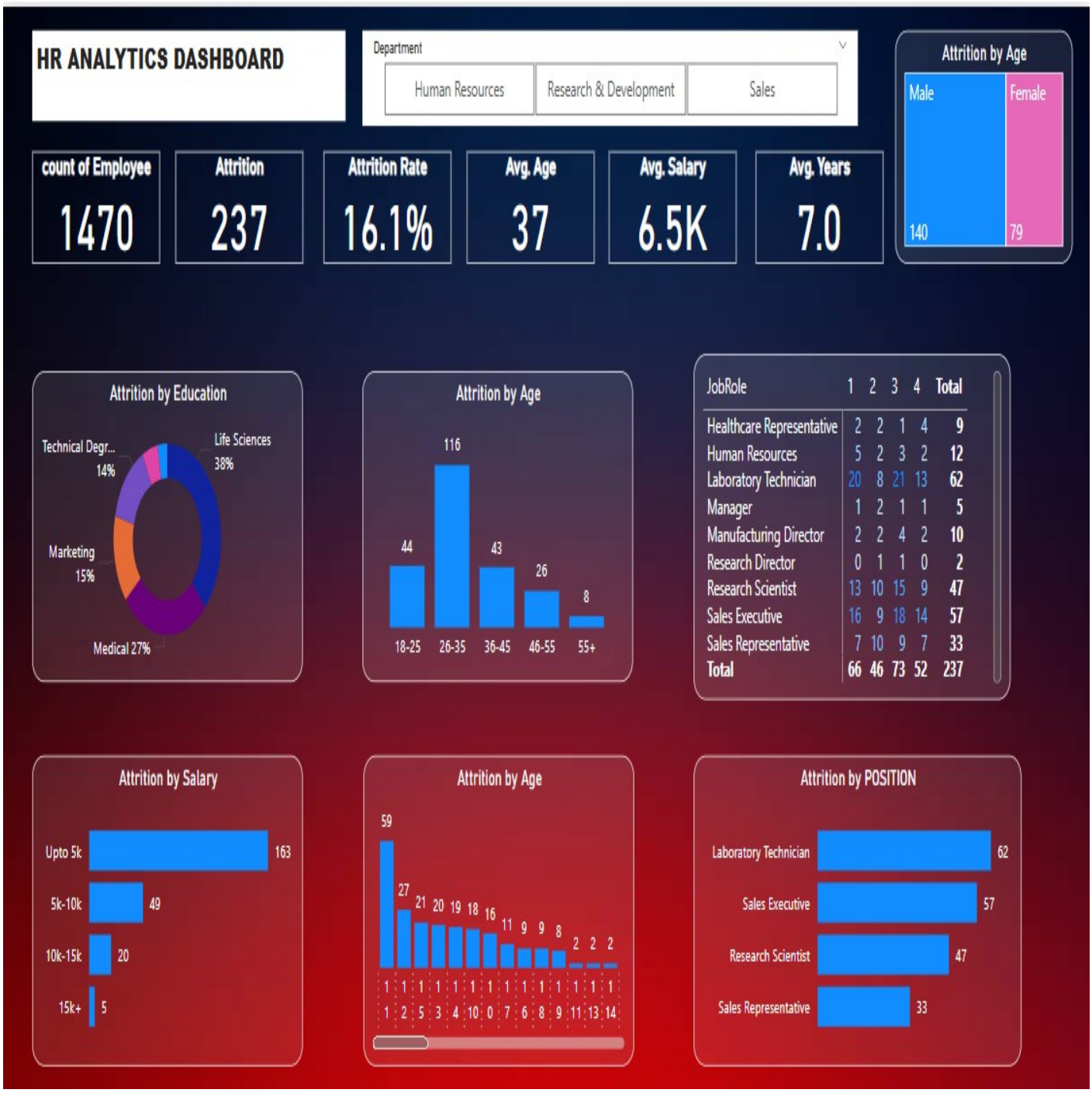
6. CONCLUSION

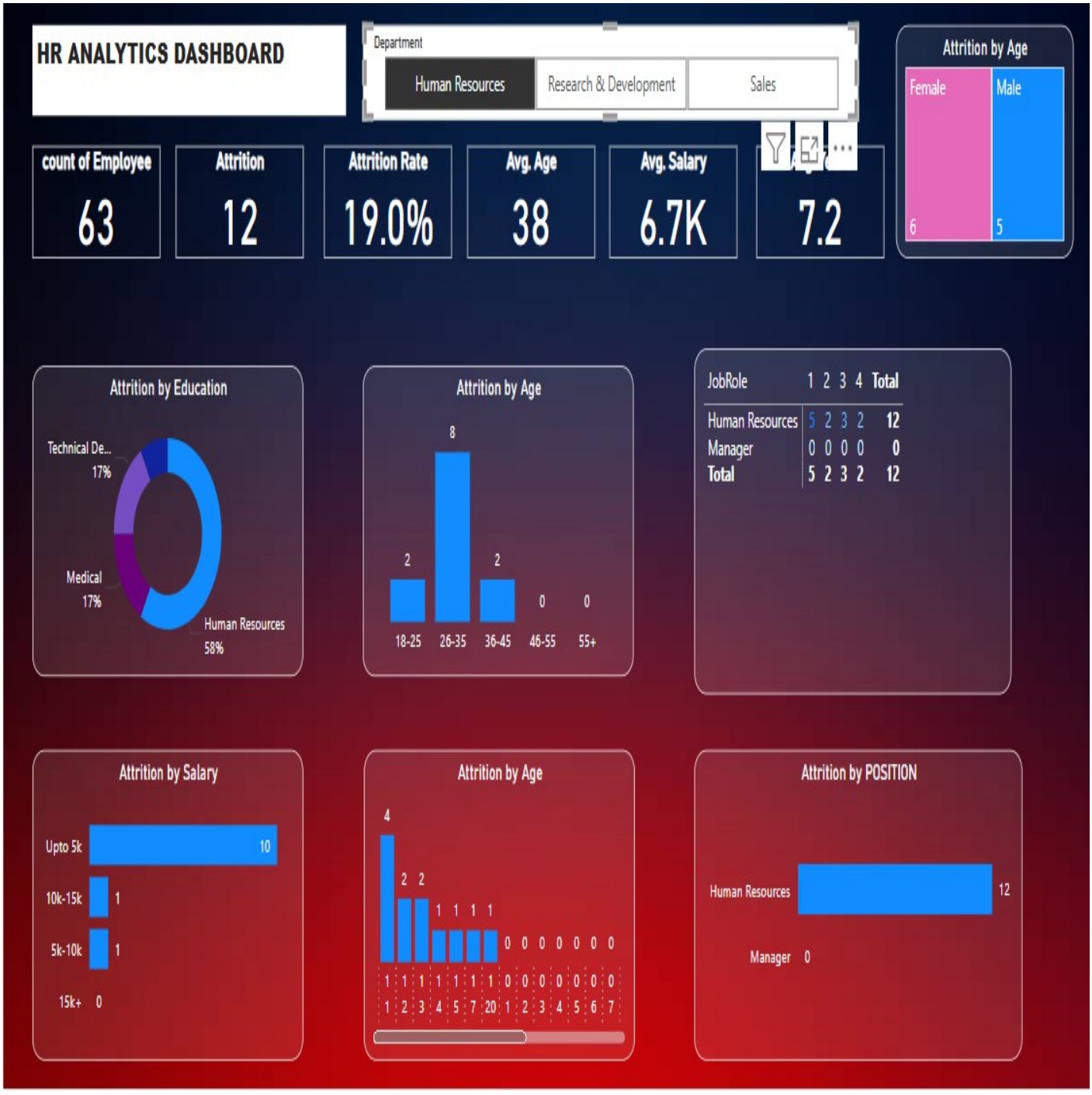
This project successfully developed an interactive desktop-based HR analytics dashboard to understand employee attrition. The application provides HR teams with the tools necessary to explore and interpret attrition trends, enhancing strategic decision-making. By focusing on visual insights and user interaction, the dashboard improves how HR professionals address employee retention issues. Future improvements can include integrating real-time databases, predictive modeling, and cloud deployment.

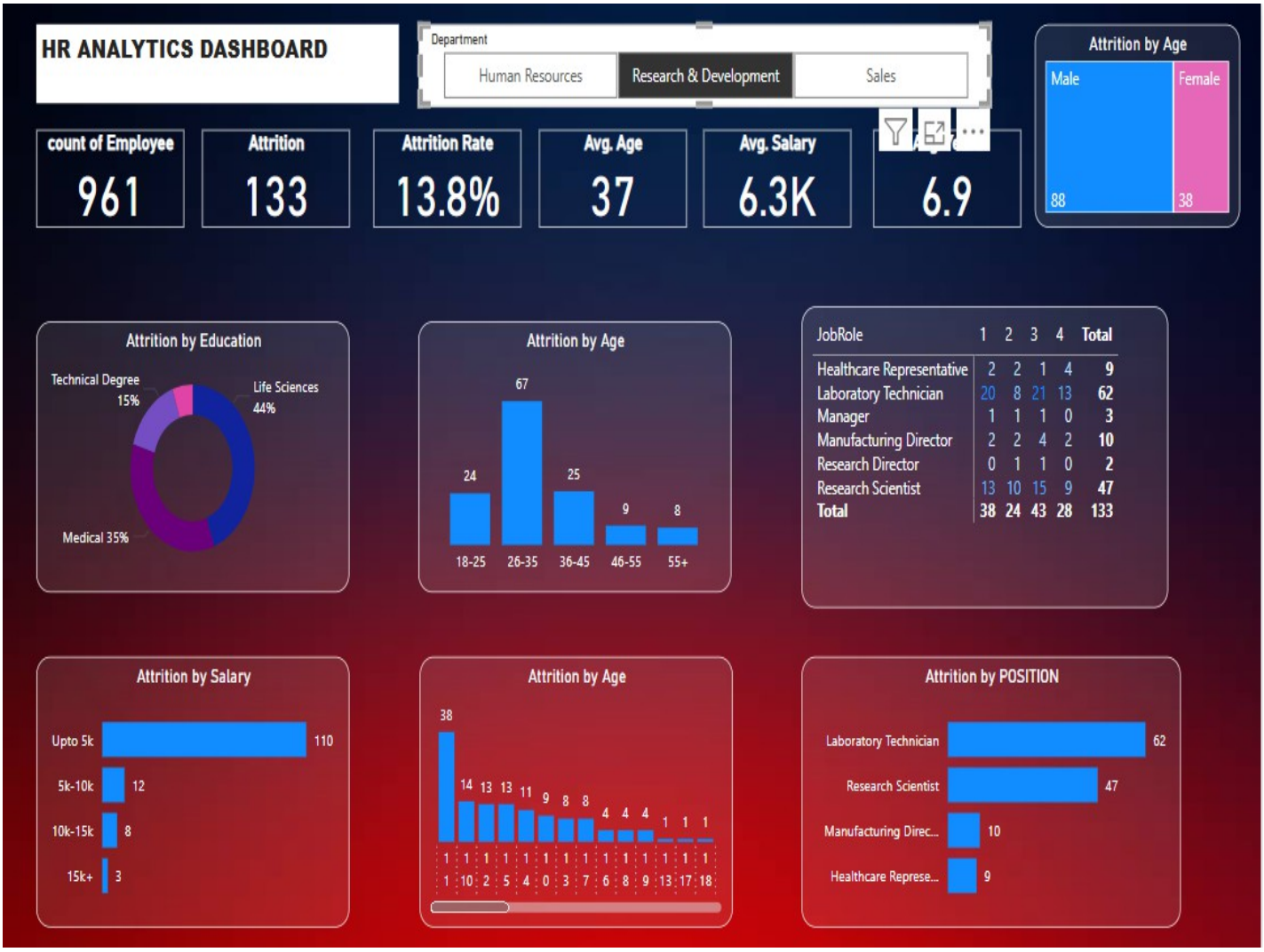
7. REFERENCES

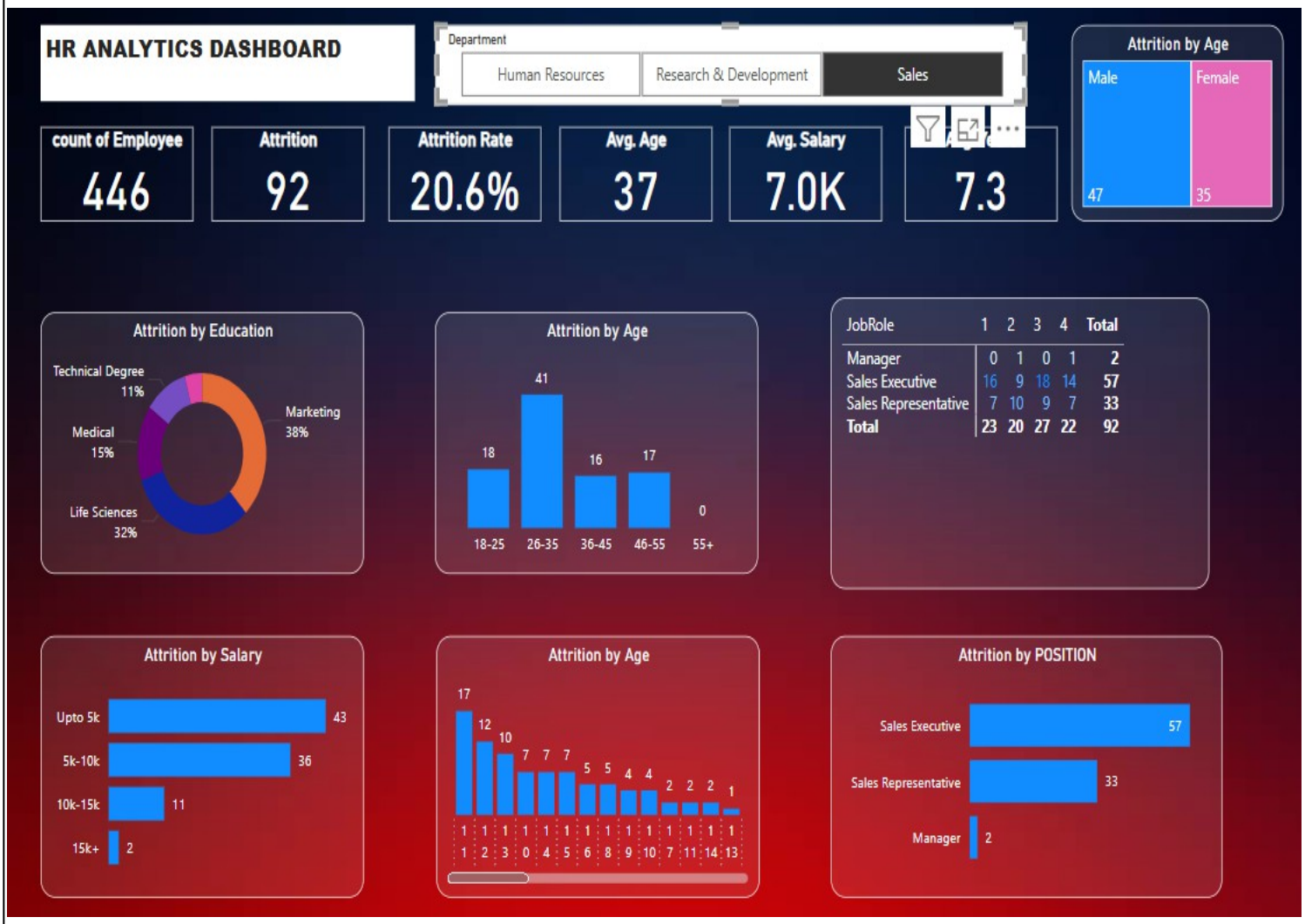
[1] • IBM HR Analytics Dataset: https://www.ibm.com/analytics/hr-analytics
[2] • Tableau HR Dashboards: https://www.tableau.com/solutions/hr-analytics
[3] • Scikit-learn Documentation: https://scikit-learn.org/
[4] • Python Data Science Handbook – Jake VanderPlas

8. RESULT


HR ANALYTICS DASHBOARD
Department
Human Resources
Research & Development
Sales
Attrition by Age
Male
Female
140
79
count of Employee
1470
Attrition
237
Attrition Rate
16.1%
Avg. Age
37
Avg. Salary
6.5K
Avg. Years
7.0
Attrition by Education
Technical Degr...
14%
Life Sciences
38%
Marketing
15%
Medical 27%
Attrition by Age
116
44
43
26
8
18-25
26-35
36-45
46-55
55+
JobRole 1 2 3 4 Total
Healthcare Representative 2 2 1 4 9
Human Resources 5 2 3 2 12
Laboratory Technician 20 8 21 13 62
Manager 1 2 1 1 5
Manufacturing Director 2 2 4 2 10
Research Director 0 1 1 0 2
Research Scientist 13 10 15 9 47
Sales Executive 16 9 18 14 57
Sales Representative 7 10 9 7 33
Total 66 46 73 52 237
Attrition by Salary
Upto 5k
163
5k-10k
49
10k-15k
20
15k+
5
Attrition by Age
59
27
21
20
19
18
16
11
9
9
8
2
2
2
1 1 1 1 1 1 1 1 1 1 1 1 1
1 2 5 3 4 10 0 7 6 8 9 11 13 14
Attrition by POSITION
Laboratory Technician
62
Sales Executive
57
Research Scientist
47
Sales Representative
33


HR ANALYTICS DASHBOARD
Department
Human Resources
Research & Development
Sales
Attrition by Age
Female
Male
6
5
count of Employee
63
Attrition
12
Attrition Rate
19.0%
Avg. Age
38
Avg. Salary
6.7K
7.2
Attrition by Education
Technical De...
17%
Medical
17%
Human Resources
58%
Attrition by Age
8
2
2
0
0
18-25
26-35
36-45
46-55
55+
JobRole 1 2 3 4 Total
Human Resources 5 2 3 2 12
Manager 0 0 0 0 0
Total 5 2 3 2 12
Attrition by Salary
Upto 5k
10
10k-15k
1
5k-10k
1
15k+
0
Attrition by Age
4
2 2
1 1 1 1
0 0 0 0 0 0 0
1 1 1 1 1 1 1 0 0 0 0 0 0 0
1 2 3 4 5 7 20 1 2 3 4 5 6 7
Attrition by POSITION
Human Resources
12
Manager
0


HR ANALYTICS DASHBOARD
Department
Human Resources
Research & Development
Sales
count of Employee
961
Attrition
133
Attrition Rate
13.8%
Avg. Age
37
Avg. Salary
6.3K
6.9
Attrition by Age
Male
Female
88
38
Attrition by Education
Technical Degree
15%
Life Sciences
44%
Medical 35%
Attrition by Age
24
67
25
9
8
18-25
26-35
36-45
46-55
55+
JobRole 1 2 3 4 Total
Healthcare Representative 2 2 1 4 9
Laboratory Technician 20 8 21 13 62
Manager 1 1 1 0 3
Manufacturing Director 2 2 4 2 10
Research Director 0 1 1 0 2
Research Scientist 13 10 15 9 47
Total 38 24 43 28 133
Attrition by Salary
Upto 5k
110
5k-10k
12
10k-15k
8
15k+
3
Attrition by Age
38
14
13
13
11
9
8
8
4
4
4
1
1
1
1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 10 2 5 4 0 3 7 6 8 9 13 17 18
Attrition by POSITION
Laboratory Technician
62
Research Scientist
47
Manufacturing Direc...
10
Healthcare Represe...
9


HR ANALYTICS DASHBOARD
Department
Human Resources
Research & Development
Sales
Attrition by Age
Male
Female
47
35
count of Employee
446
Attrition
92
Attrition Rate
20.6%
Avg. Age
37
Avg. Salary
7.0K
7.3
Attrition by Education
Technical Degree
11%
Marketing
38%
Medical
15%
Life Sciences
32%
Attrition by Age
18
41
16
17
0
18-25
26-35
36-45
46-55
55+
JobRole 1 2 3 4 Total
Manager 0 1 0 1 2
Sales Executive 16 9 18 14 57
Sales Representative 7 10 9 7 33
Total 23 20 27 22 92
Attrition by Salary
Upto 5k
43
5k-10k
36
10k-15k
11
15k+
2
Attrition by Age
17
12
10
7
7
7
5
5
4
4
2
2
2
1
1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 2 3 0 4 5 6 8 9 10 7 11 14 13
Attrition by POSITION
Sales Executive
57
Sales Representative
33
Manager
2