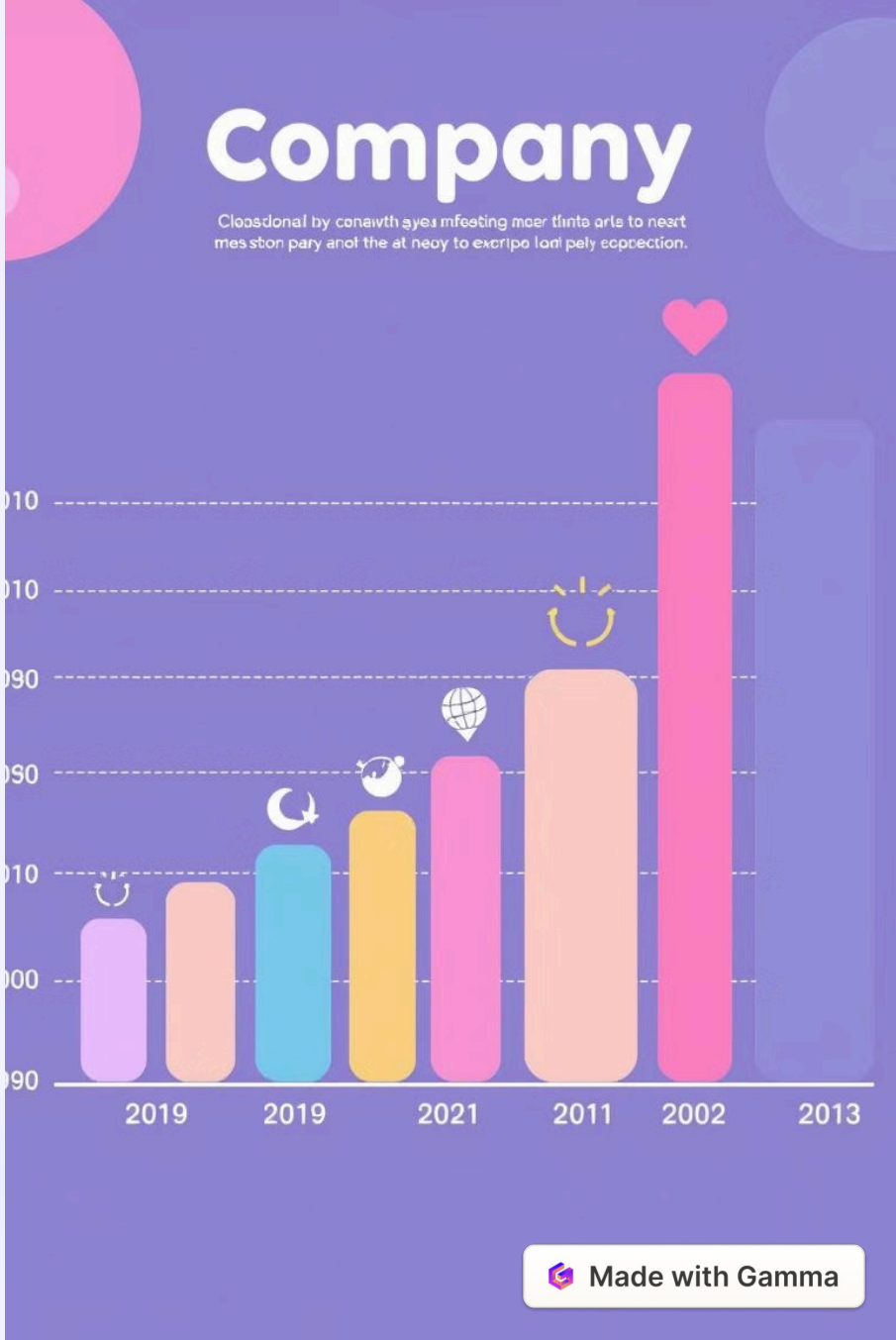
Analyzing Attrition Rates: Identifying Key Drivers

This presentation explores the key drivers of employee attrition and analyzes the impact of factors like tenure, age, and compensation on retention rates.

by Sai Kiran reddy Tallapureddy



[2]:
```
import numpy as np
import seaborn as sns
import pandas as pd
import matplotlib.pyplot as plt
```

[4]:
```
dataset=pd.read_csv("greendestination (1) (1).csv")
```

[5]:
```
dataset
```

[5]:

	Age	Attrition	BusinessTravel	DailyRate	Department	DistanceFromHome	Education	EducationField	EmployeeCount	EmployeeNumber	...	RelationshipSatisf
0	41	Yes	Travel_Rarely	1102	Sales	1	2	Life Sciences	1	1	...	
1	49	No	Travel_Frequently	279	Research & Development	8	1	Life Sciences	1	2	...	
2	37	Yes	Travel_Rarely	1373	Research & Development	2	2	Other	1	4	...	
3	33	No	Travel_Frequently	1392	Research & Development	3	4	Life Sciences	1	5	...	
4	27	No	Travel_Rarely	591	Research & Development	2	1	Medical	1	7	...	
...	...	...	...	...	...	...	...	...	...	...	...	
1465	36	No	Travel_Frequently	884	Research & Development	23	2	Medical	1	2061	...	
1466	39	No	Travel_Rarely	613	Research & Development	6	1	Medical	1	2062	...	

Understanding Employee Tenure: The Impact of "YearsAtCompany"

Early Attrition

New employees tend to leave at a higher rate, often due to factors like job mismatch or lack of adaptation.

Long-Term Retention

Employees with longer tenures are more likely to stay, indicating greater job satisfaction and commitment.

```
 25  RelationshipSatisfaction  1470 non-null   int64
 26  StandardHours             1470 non-null   int64
 27  StockOptionLevel          1470 non-null   int64
 28  TotalWorkingYears         1470 non-null   int64
 29  TrainingTimesLastYear     1470 non-null   int64
 30  WorkLifeBalance           1470 non-null   int64
 31  YearsAtCompany            1470 non-null   int64
 32  YearsInCurrentRole        1470 non-null   int64
 33  YearsSinceLastPromotion   1470 non-null   int64
 34  YearsWithCurrManager      1470 non-null   int64
dtypes: int64(26), object(9)
memory usage: 402.1+ KB
```

[15]:

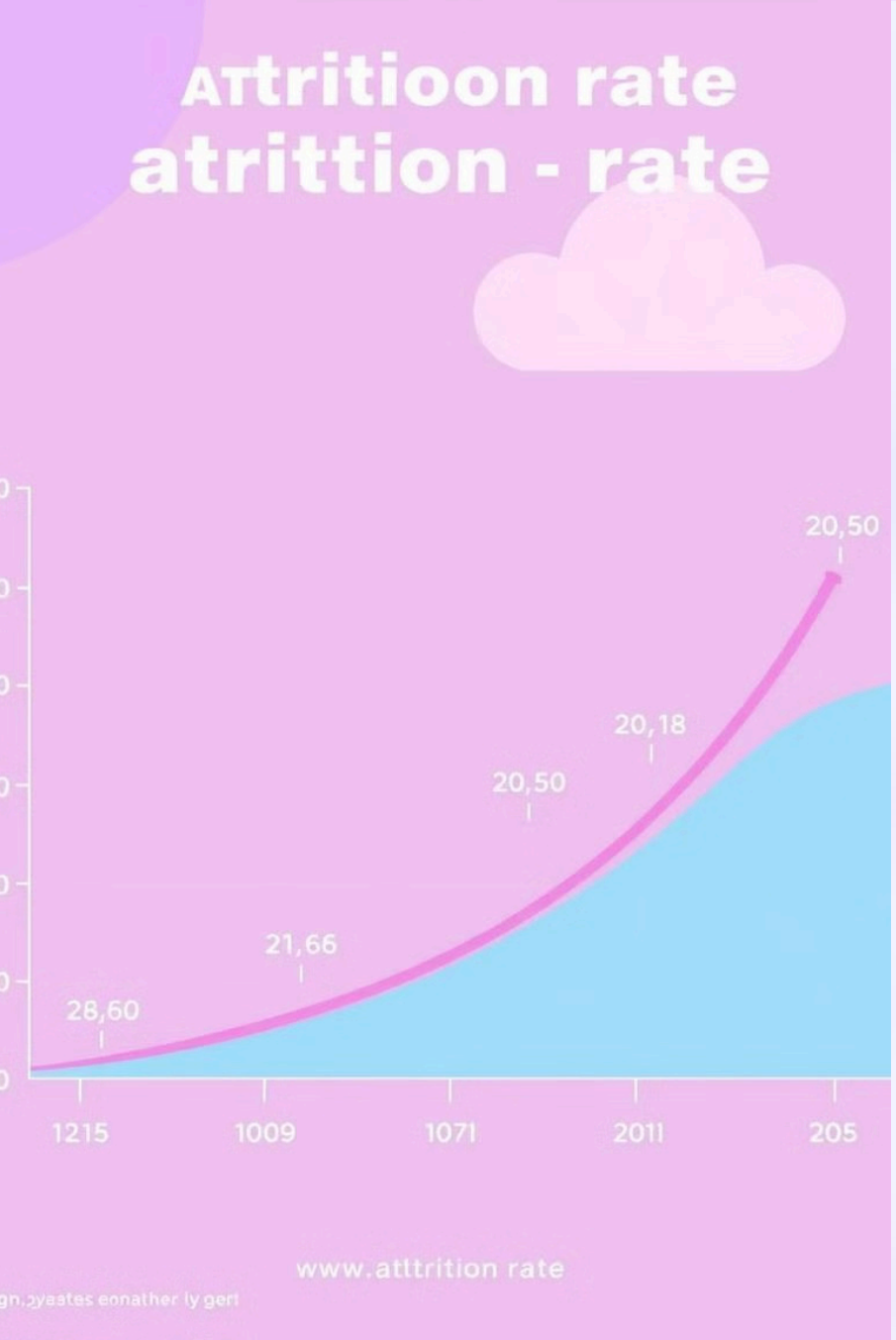
```python
#normalize function is used to return the relative frequencies
attrition_rate = dataset['Attrition'].value_counts(normalize=True) *100
print("Attrition Rate:\n", attrition_rate)
```

```
Attrition Rate:
 Attrition
No     83.877551
Yes    16.122449
Name: proportion, dtype: float64
```

[37]:

```python
columns_clean = ["YearsAtCompany", "Age", "MonthlyIncome"]

# remove outliers using IQR
def iqr(df, column):
    Q1 = dataset[column].quantile(0.25)  # 25th percentile
    Q3 = dataset[column].quantile(0.75)  # 75th percentile
    IQR = Q3 - Q1  # Interquartile range
```



The Influence of Age on Attrition

Early Career

Younger employees are more likely to explore new opportunities and may have a higher tolerance for change.

Mid-Career

Employees in their mid-careers may experience a dip in attrition as they've established themselves and gained experience.

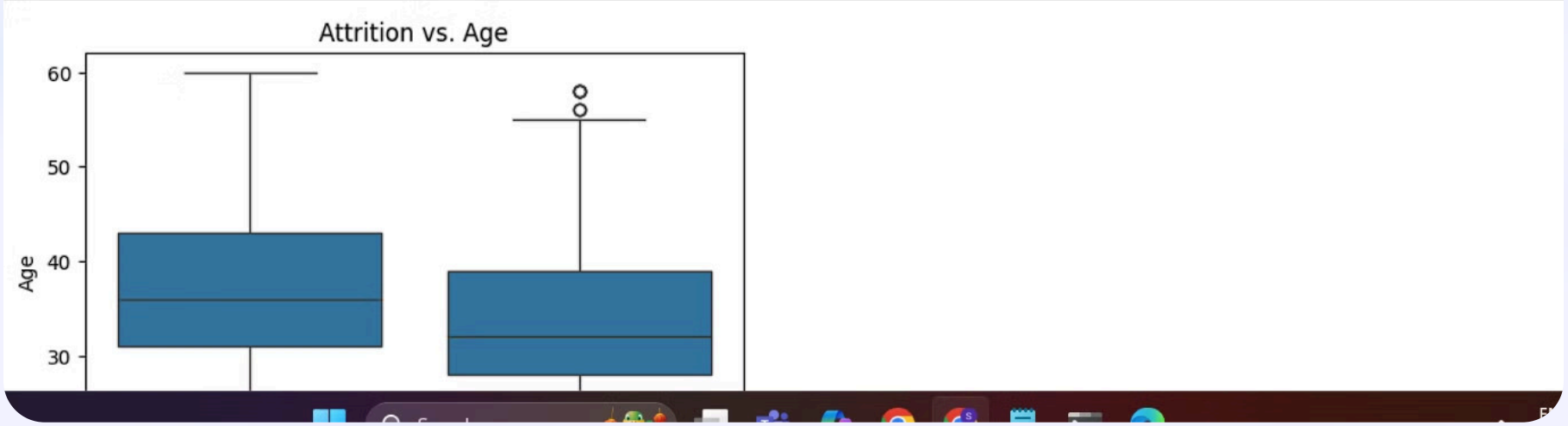
Late Career

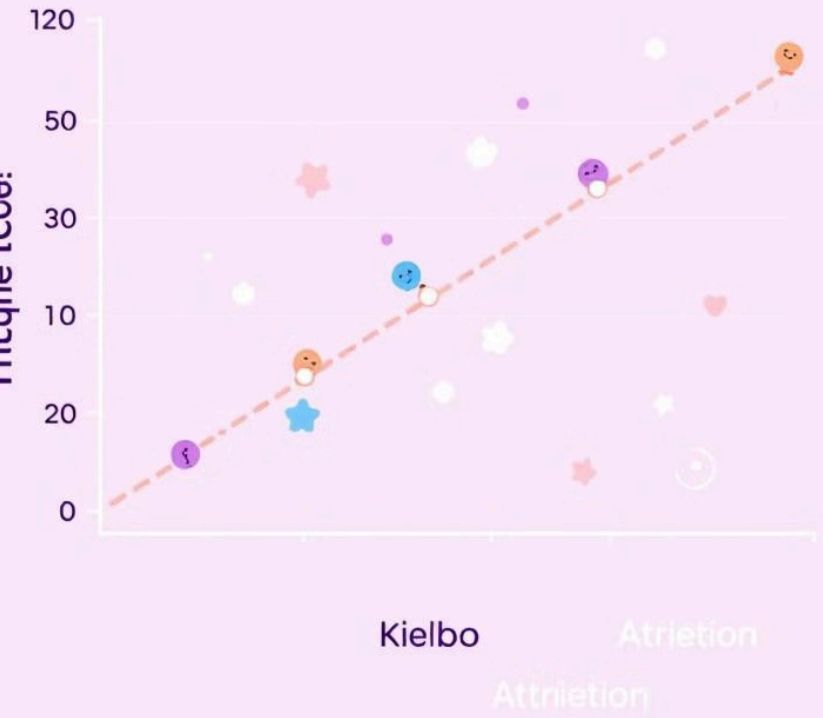
Older employees, nearing retirement, may have lower attrition rates due to financial stability and career satisfaction.

```python
# Age vs. Attrition
plt.figure(figsize=(6,4))
sns.boxplot(x="Attrition", y="Age", data=dataset)
plt.title("Attrition vs. Age")
plt.show()

# Years at Company vs. Attrition
plt.figure(figsize=(6,4))
sns.boxplot(x="Attrition", y="YearsAtCompany", data=dataset)
plt.title("Attrition vs. Years at Company")
plt.show()

# Income vs. Attrition
plt.figure(figsize=(6,4))
sns.boxplot(x="Attrition", y="MonthlyIncome", data=dataset)
plt.title("Attrition vs. Monthly Income")
plt.show()
```





The Role of Compensation: Examining "MonthlyIncome"

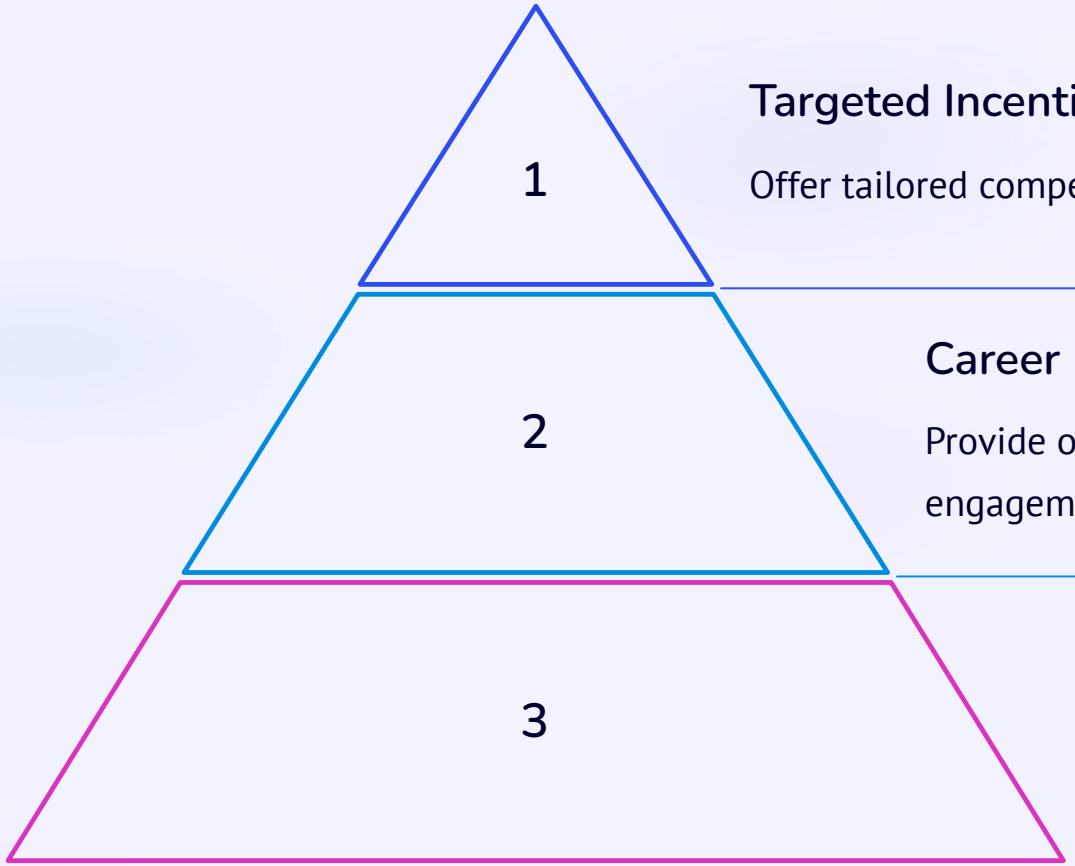
Salary

Employees with lower salaries may be more susceptible to leaving for better compensation elsewhere.

Benefits

Comprehensive benefits packages, beyond base salary, can play a significant role in retaining employees.

Retention Strategies for High-Risk Employees



Targeted Incentives

Offer tailored compensation and benefits packages to address specific needs.

Career Development

Provide opportunities for growth and skill development to enhance engagement.

Employee Recognition

Acknowledge contributions and successes to foster a sense of appreciation.

```python
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import LabelEncoder
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score, classification_report

label_encoder = LabelEncoder()
dataset['Attrition'] = label_encoder.fit_transform(dataset['Attrition'])  # Yes=1, No=0


features = ["Age", "YearsAtCompany", "MonthlyIncome"]
X = dataset[features]
y = dataset["Attrition"]


X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

model = LogisticRegression()
model.fit(X_train, y_train)

y_pred = model.predict(X_test)

accuracy = accuracy_score(y_test, y_pred)*100
print(f"Model Accuracy: {accuracy}")
print("Classification Report:\n", classification_report(y_test, y_pred))
```

```
Model Accuracy: 86.73469387755102
Classification Report:
              precision    recall  f1-score   support

           0       0.87      1.00      0.93       255
           1       0.00      0.00      0.00        39
```

Data-Driven Insights: Visualizing Attrition Patterns

1

Trend Analysis

Identify patterns in attrition data over time to anticipate future trends.

2

Segmentation

Group employees into categories based on characteristics to understand different attrition drivers.

3

Predictive Modeling

Use historical data to predict future attrition and develop proactive strategies.

Conclusion and Next Steps

By analyzing attrition data, we can gain valuable insights into employee satisfaction, retention, and company growth. This information can guide us in developing effective strategies to improve employee engagement and reduce attrition.