**Employee Data Analysis Report**

**1. Dataset Description**

* 1. **Source:** Internal office employees dataset (1,000 records).

**1.2 Columns:**

* + employee\_id – Unique identifier
  + employee\_name – Employee’s full name (939 unique, some duplicates)
  + department – 6 unique departments (HR, Marketing, Finance, Accounts, Purchasing, etc.)
  + state – 5 states (major share from Alaska & California)
  + salary – Ranging from 1,006 to 9,985
  + age – Ranging from 20 to 50 years
  + bonus – Ranging from 500 to 2,000

**1.3 Data Quality:**

* + No missing values
  + Clean and consistent
  + Balanced structure with geographic and departmental diversity

1.4

**2. Operations Performed**

**2.1 Data Cleaning & Exploration**

* + No missing/null values observed
  + Checked unique values in categorical columns
  + Summarized numerical columns (mean, median, standard deviation, IQR)

**2.2 Descriptive Analytics**

* + Departmental employee count (pie chart)
  + State-wise employee distribution (bar chart)
  + Salary & Age distribution analysis (histogram, boxplots)
  + Bonus distribution (histogram)

**2.3 Relationship Analysis**

* + Age vs. Salary (bubble chart with bonus as size factor)
  + Department vs. Bonus comparison
  + Salary variations by state

**3. Key Insights**

**3.1 Workforce Demographics**

* Age distribution centers around **25–40 years** → young to mid-career dominant.
* Average employee age: **35.3 years**.
* Fewer employees above 45 → lower senior-level representation.

**3.2 Departmental Insights**

* HR has the **largest workforce (171 employees)**.
* Other departments show fairly balanced representation.
* Larger departments may indicate operational importance (e.g., HR, Marketing).

**3.3 Salary Insights**

* Salary range: **1,006 – 9,985**
* Average salary: **~5,330**; Median: **5,188**
* Salaries are moderately spread (Std Dev ≈ 2,603).
* Mid-level salaries dominate; a few very high salaries likely belong to senior executives.

**3.4 Bonus Trends**

* Bonus range: **500 – 2,000**
* Average: **1,253**; Median: **1,245**
* Fair distribution, suggesting performance-based incentives.
* Marketing & Finance likely enjoy higher bonuses.

**3.5 Geographic Spread**

* Employees are distributed across 5 states.
* **Alaska (209 employees)** has the largest workforce concentration.
* California also holds a significant share.
* Smaller states host fewer employees, likely branch/satellite offices.

**4. Recommendations**

* 1. **Talent Development & Retention**
  + Encourage **leadership training** for younger employees to fill the upcoming senior-level gap.
  + Improve **retention strategies** for employees above 45 to maintain experience balance.

**4.2 Compensation Strategy**

* + Conduct **pay equity analysis** to reduce disparities across departments.
  + Align high salaries with measurable performance outcomes.
  + Review **bonus policies** to ensure fairness and motivation across all teams.

**4.3 Workforce Allocation**

* + Reassess HR’s large headcount relative to other departments – possible **overstaffing**.
  + Consider reallocating resources to core business functions (e.g., Marketing, Finance).
  1. **Geographic Operations**
  + Evaluate why Alaska has the highest concentration – operational necessity or imbalance.
  + Consider **diversifying workforce presence** to other states to reduce dependency risk.

**4.5 Future Analytics Opportunities**

* + Build **predictive models** (e.g., attrition prediction, salary forecasting).
  + Use **clustering** to group employees by salary, age, and bonus for strategic HR planning.
  + Track **department productivity vs. compensation** to refine budgeting.