# 9. Employee Attrition Prediction

| EmployeeID | JobRole | Salary | Job Satisfaction (1-10) | Attrition (Yes/No) |
|---|---|---|---|---|
| 1 | Manager | 80 | 8 | No |
| 2 | Developer | 60 | 6 | Yes |
| 3 | Analyst | 50 | 7 | No |
| 4 | Developer | 65 | 5 | Yes |
| 5 | Manager | 90 | 9 | No |
| 6 | Analyst | 55 | 4 | Yes |
| 7 | Developer | 70 | 8 | No |
| 8 | Manager | 85 | 7 | No |
| 9 | Analyst | 45 | 3 | Yes |
| 10 | Developer | 75 | 9 | No |
| 11 | Manager | 95 | 10 | No |
| 12 | Analyst | 40 | 2 | Yes |
| 13 | Developer | 55 | 6 | Yes |
| 14 | Manager | 88 | 8 | No |
| 15 | Analyst | 52 | 5 | Yes |
| 16 | Developer | 68 | 7 | No |
| 17 | Manager | 82 | 6 | No |
| 18 | Analyst | 48 | 4 | Yes |
| 19 | Developer | 72 | 8 | No |
| 20 | Manager | 92 | 9 | No |

# 1. Probability Basics:

(a) $P(\text{attrition} = \text{Yes}) = \dfrac{10}{20} = 0.5 = 50\%$

(b) $P(\text{selected employee is a manager}) = \dfrac{9}{20} = 0.45 = 45\%$

# 2. Conditional Probability:

(a) $P(\text{employee has left} \mid \text{Developer}) = P(\text{Attrition} = \text{Yes} \mid \text{Dev})$

$= \dfrac{3}{6} = 0.50 (50\%)$

(b) $P(\text{Attrition} = \text{Yes} \mid \text{satisfaction level} \le 5)$

$= \dfrac{3}{3} = 1 = 100\%$

# 3. Joint Probability:

(a) $P(\text{employee is a manager and has left the company})$

$P(\text{Man}) = \dfrac{3}{20} = 0.15 = 15\%$

(b) P( employee is Analyst and has not left company)

$= \dfrac{1}{20} = 0.05 = 5\%$

## 4. Advanced probability

(a) P ( employee has left given salary $< \$ 60k$).

$= P(\text{Attrition} = \text{Yes} \mid \text{Salary} < 60k)$

$= \dfrac{5}{7} = 71.4\%$

(b) P( employee has left given they are not a Manager)

$P(\text{attrition} = \text{Yes} \mid \text{Not manager}) = \dfrac{7}{11} \approx 63.6\%$

## 5. Interpretation

**(a)** highest attrition rate

- Manager $= \dfrac{3}{9} = 33.3\%$
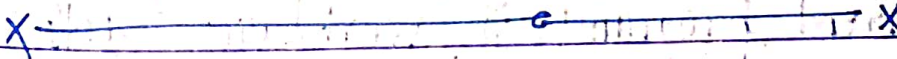
- Developer $= \dfrac{3}{6} = 50.0\%$

- Analysts $= \dfrac{4}{5} = 80\%$

**(b)** Overall attrition rate vs. attrition for low job satisfaction ($\leq 5$)

- Overall Attrition: $\dfrac{10}{20} = 50\%$

- Job satisfaction $\leq 5 : 100\%$

$\Rightarrow$ employees with low job satisfaction ($\leq 5$) have a much higher attrition rate (100%) compared to the overall 50%.

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Business Recommendation -

1. Addressing high attrition among analysts

⟹ 80% attrition rate.

- Finding root cause of attritions by conducting exit interviews.

- may be become more competitive in salaries

- training programs, mentoring, etc.

2. Improve Job satisfaction.

∴ employee with satisfaction $\leq 5$ have a 100% attrition rate.

- work environment betterment ⟹ more investment in workplace conditions (Gyms, amenities, services, food, etc)

- employee engagement programs ⟹ workplace activity, team building exercises, company dinners, etc.

3. Reevaluate Salary for Lower paid employees.

- employees earning less than $60k experience a high attrition rate (71.4%)

⟹ salary review
⟹ Incentives & benefits.

4. Developers & analysts have a 63.6% attrition rate.

⟹ focus on these roles.

5. Overall retention rate is 50%.

⟹ company's work environment is not good a full through research is required to address their issues.

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