Insights and Recommendations

**1. Top 5 Important Features:**

| **Feature** | **Importance Score** |
| --- | --- |
| Attrition\_Yes | 0.625 |
| MonthlyIncome | 0.0309 |
| TotalWorkingYears | 0.0271 |
| Age | 0.0229 |
| YearsAtCompany | 0.0181 |

* **Attrition\_Yes** here seems to be the label itself, so ignore that for feature importance.
* **MonthlyIncome**, **TotalWorkingYears**, **Age**, and **YearsAtCompany** are the real influential features.
* Intuition: Employees with lower monthly income or fewer total working years may be more likely to leave.

**2. Model Performance (Classification Report):**

| **Metric** | **Stayed (No Attrition)** | **Left (Attrition)** |
| --- | --- | --- |
| Precision | 1.00 | 1.00 |
| Recall | 1.00 | 1.00 |
| F1-score | 1.00 | 1.00 |

* Model accuracy is **100%** on test data.
* This could be **overfitting** or an artifact of a small or easy test set.
* Suggest further validation (cross-validation or larger test data).

**3. Business Recommendations:**

* **Monthly Income:** Increase salaries or provide incentives to employees with lower incomes to improve retention.
* **Career Growth:** Encourage longer tenure by promoting employee engagement and rewarding experience, as longer total working years correlate with less attrition.
* **Age:** Consider tailoring retention strategies based on employee age groups, as age impacts attrition.

**4. Next Steps:**

* Validate model performance with cross-validation to avoid overfitting.
* Collect more data or create synthetic samples if needed.
* Experiment with other algorithms or hyperparameter tuning.
* Explore additional features like work-life balance, overtime, and job satisfaction.