**Outcome:** A classification model for employee attrition with explainable insights for HR retention strategies.

Using a Random Forest Classifier trained on the IBM HR dataset, the model achieved an overall accuracy of **88.10%**. However, the recall for predicting employees who left the company was low (**13%**), indicating class imbalance and the need for better handling of minority class predictions.

**Top contributing features identified by the model:**

1. **OverTime** – Employees working overtime were more likely to leave.  
   → *HR Strategy:* Limit excessive overtime and encourage a healthy work-life balance.
2. **MonthlyIncome** – Lower income levels were linked with higher attrition.  
   → *HR Strategy:* Reassess compensation structures and offer competitive salaries.
3. **JobRole** – Certain roles had higher attrition rates.  
   → *HR Strategy:* Implement role-specific engagement programs and development opportunities.
4. **EnvironmentSatisfaction** – Low satisfaction in work environment increased attrition risk.  
   → *HR Strategy:* Conduct regular employee feedback surveys and improve workplace conditions.
5. **YearsAtCompany** – Employees with shorter tenures were more prone to leave.  
   → *HR Strategy:* Enhance onboarding processes and provide early career mentorship.

**Interpret Key Features:**

| **Feature** | **Importance** | **Possible Insight** |
| --- | --- | --- |
| OverTime | High | Employees doing overtime are more likely to leave. |
| MonthlyIncome | High | Low income might be associated with high attrition. |
| JobRole | Medium | Some roles have higher attrition risk. |
| EnvironmentSatisfaction | Medium | Low satisfaction may trigger resignations. |
| YearsAtCompany | Medium | Newer employees may churn faster. |

**Actionable HR Strategies:**

| **Insight** | **Retention Strategy** |
| --- | --- |
| **High OverTime** leads to attrition | Monitor workloads, promote better work-life balance, enforce time-off policies. |
| **Low MonthlyIncome** linked to attrition | Review salary structures, offer performance bonuses, and transparent promotion paths. |
| **Low EnvironmentSatisfaction** | Conduct surveys and act on feedback — improve workplace culture, recognition, and facilities. |
| **High Attrition in Certain JobRoles** | Offer job rotation or career growth programs to reduce burnout or stagnation. |
| **Short Tenure = High Attrition** | Implement mentorship programs for new hires, regular check-ins, and onboarding support. |