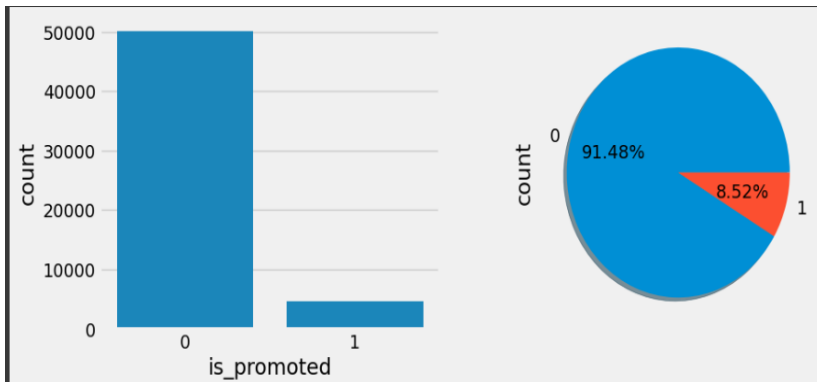


## Data Collection and Preprocessing Phase

|               |  |
|---------------|--|
| Date          | 15 March 2024  |
| Team ID       | Advait Mahesh Shinde   |
| Project Title | Human Resource Management: Predicting Employee Promotions Using Machine Learning |
| Maximum Marks | 6 Marks  |

### Data Exploration and Preprocessing Template

Optimizing Human Resource Management by employing machine learning techniques to predict employee promotions, enhancing workforce planning and development.

| Section             | Description  |             |                  |        |                     |                 |                     |                      |                   |                      |                         |                    |                         |                    |             |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |           |            |   |          |     |      |     |     |     |     |      |     |   |                   |           |            |   |       |     |      |     |      |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |           |          |            |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |            |           |                  |   |          |     |      |     |     |     |     |      |     |   |           |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |    |            |           |      |   |          |     |      |      |     |     |     |      |     |    |                   |          |            |   |          |     |      |     |     |     |     |      |
|---------------------|--|-------------|------------------|--------|---------------------|-----------------|---------------------|----------------------|-------------------|----------------------|-------------------------|--------------------|-------------------------|--------------------|-------------|---|-------------------|----------|------------------|---|----------|-----|------|-----|-----|-----|-----|------|-----|---|------------|-----------|------------|---|-------|-----|------|-----|-----|-----|-----|------|-----|---|-------------------|-----------|------------|---|----------|-----|------|-----|-----|-----|-----|------|-----|---|-------------------|-----------|------------|---|-------|-----|------|-----|------|-----|-----|------|-----|---|------------|-----------|------------|---|-------|-----|------|-----|-----|-----|-----|------|-----|---|-----------|----------|------------|---|----------|-----|------|-----|-----|-----|-----|------|-----|---|------------|-----------|------------|---|-------|-----|------|-----|-----|-----|-----|------|-----|---|------------|-----------|------------------|---|----------|-----|------|-----|-----|-----|-----|------|-----|---|-----------|-----------|------------|---|-------|-----|------|-----|-----|-----|-----|------|-----|---|-------------------|----------|------------------|---|----------|-----|------|-----|-----|-----|-----|------|-----|----|------------|-----------|------|---|----------|-----|------|------|-----|-----|-----|------|-----|----|-------------------|----------|------------|---|----------|-----|------|-----|-----|-----|-----|------|
| Data Overview       | <u>54808 rows x 14 columns</u>   |             |                  |        |                     |                 |                     |                      |                   |                      |                         |                    |                         |                    |             |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |           |            |   |          |     |      |     |     |     |     |      |     |   |                   |           |            |   |       |     |      |     |      |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |           |          |            |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |            |           |                  |   |          |     |      |     |     |     |     |      |     |   |           |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |    |            |           |      |   |          |     |      |      |     |     |     |      |     |    |                   |          |            |   |          |     |      |     |     |     |     |      |
|                     | <u>Descriptive statistics:</u>   |             |                  |        |                     |                 |                     |                      |                   |                      |                         |                    |                         |                    |             |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |           |            |   |          |     |      |     |     |     |     |      |     |   |                   |           |            |   |       |     |      |     |      |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |           |          |            |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |            |           |                  |   |          |     |      |     |     |     |     |      |     |   |           |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |    |            |           |      |   |          |     |      |      |     |     |     |      |     |    |                   |          |            |   |          |     |      |     |     |     |     |      |
|                     | <table><thead><tr><th>employee_id</th><th>department</th><th>region</th><th>education</th><th>gender</th><th>recruitment_channel</th><th>no.of_trainings</th><th>age</th><th>previous_year_rating</th><th>length_of_service</th><th>KPIs met<br/>360°</th><th>awards_won<sup>3</sup></th><th>avg_training_score</th><th>is_promoted</th></tr></thead><tbody><tr><td>0</td><td>Sales &amp; Marketing</td><td>region_7</td><td>Master's &amp; above</td><td>f</td><td>sourcing</td><td>1.0</td><td>36.0</td><td>5.0</td><td>8.0</td><td>1.0</td><td>0.0</td><td>49.0</td><td>0.0</td></tr><tr><td>1</td><td>Operations</td><td>region_22</td><td>Bachelor's</td><td>m</td><td>other</td><td>1.0</td><td>30.0</td><td>5.0</td><td>4.0</td><td>0.0</td><td>0.0</td><td>60.0</td><td>0.0</td></tr><tr><td>2</td><td>Sales &amp; Marketing</td><td>region_19</td><td>Bachelor's</td><td>m</td><td>sourcing</td><td>1.0</td><td>34.0</td><td>3.0</td><td>7.0</td><td>0.0</td><td>0.0</td><td>60.0</td><td>0.0</td></tr><tr><td>3</td><td>Sales &amp; Marketing</td><td>region_23</td><td>Bachelor's</td><td>m</td><td>other</td><td>2.0</td><td>39.0</td><td>1.0</td><td>10.0</td><td>0.0</td><td>0.0</td><td>50.0</td><td>0.0</td></tr><tr><td>4</td><td>Technology</td><td>region_26</td><td>Bachelor's</td><td>m</td><td>other</td><td>1.0</td><td>45.0</td><td>3.0</td><td>2.0</td><td>0.0</td><td>0.0</td><td>73.0</td><td>0.0</td></tr><tr><td>5</td><td>Analytics</td><td>region_2</td><td>Bachelor's</td><td>m</td><td>sourcing</td><td>2.0</td><td>31.0</td><td>3.0</td><td>7.0</td><td>0.0</td><td>0.0</td><td>85.0</td><td>0.0</td></tr><tr><td>6</td><td>Operations</td><td>region_20</td><td>Bachelor's</td><td>f</td><td>other</td><td>1.0</td><td>31.0</td><td>3.0</td><td>5.0</td><td>0.0</td><td>0.0</td><td>59.0</td><td>0.0</td></tr><tr><td>7</td><td>Operations</td><td>region_34</td><td>Master's &amp; above</td><td>m</td><td>sourcing</td><td>1.0</td><td>33.0</td><td>3.0</td><td>6.0</td><td>0.0</td><td>0.0</td><td>63.0</td><td>0.0</td></tr><tr><td>8</td><td>Analytics</td><td>region_20</td><td>Bachelor's</td><td>m</td><td>other</td><td>1.0</td><td>20.0</td><td>4.0</td><td>5.0</td><td>0.0</td><td>0.0</td><td>89.0</td><td>0.0</td></tr><tr><td>9</td><td>Sales &amp; Marketing</td><td>region_1</td><td>Master's &amp; above</td><td>m</td><td>sourcing</td><td>1.0</td><td>32.0</td><td>5.0</td><td>6.0</td><td>1.0</td><td>0.0</td><td>64.0</td><td>0.0</td></tr><tr><td>10</td><td>Technology</td><td>region_23</td><td>High</td><td>m</td><td>sourcing</td><td>1.0</td><td>30.0</td><td>High</td><td>1.0</td><td>0.0</td><td>0.0</td><td>77.0</td><td>0.0</td></tr><tr><td>11</td><td>Sales &amp; Marketing</td><td>region_7</td><td>Bachelor's</td><td>f</td><td>sourcing</td><td>1.0</td><td>35.0</td><td>5.0</td><td>3.0</td><td>1.0</td><td>0.0</td><td>50.0</td><td>1.0</td></tr></tbody></table> | employee_id | department       | region | education           | gender          | recruitment_channel | no.of_trainings      | age               | previous_year_rating | length_of_service       | KPIs met<br>360°   | awards_won <sup>3</sup> | avg_training_score | is_promoted | 0 | Sales & Marketing | region_7 | Master's & above | f | sourcing | 1.0 | 36.0 | 5.0 | 8.0 | 1.0 | 0.0 | 49.0 | 0.0 | 1 | Operations | region_22 | Bachelor's | m | other | 1.0 | 30.0 | 5.0 | 4.0 | 0.0 | 0.0 | 60.0 | 0.0 | 2 | Sales & Marketing | region_19 | Bachelor's | m | sourcing | 1.0 | 34.0 | 3.0 | 7.0 | 0.0 | 0.0 | 60.0 | 0.0 | 3 | Sales & Marketing | region_23 | Bachelor's | m | other | 2.0 | 39.0 | 1.0 | 10.0 | 0.0 | 0.0 | 50.0 | 0.0 | 4 | Technology | region_26 | Bachelor's | m | other | 1.0 | 45.0 | 3.0 | 2.0 | 0.0 | 0.0 | 73.0 | 0.0 | 5 | Analytics | region_2 | Bachelor's | m | sourcing | 2.0 | 31.0 | 3.0 | 7.0 | 0.0 | 0.0 | 85.0 | 0.0 | 6 | Operations | region_20 | Bachelor's | f | other | 1.0 | 31.0 | 3.0 | 5.0 | 0.0 | 0.0 | 59.0 | 0.0 | 7 | Operations | region_34 | Master's & above | m | sourcing | 1.0 | 33.0 | 3.0 | 6.0 | 0.0 | 0.0 | 63.0 | 0.0 | 8 | Analytics | region_20 | Bachelor's | m | other | 1.0 | 20.0 | 4.0 | 5.0 | 0.0 | 0.0 | 89.0 | 0.0 | 9 | Sales & Marketing | region_1 | Master's & above | m | sourcing | 1.0 | 32.0 | 5.0 | 6.0 | 1.0 | 0.0 | 64.0 | 0.0 | 10 | Technology | region_23 | High | m | sourcing | 1.0 | 30.0 | High | 1.0 | 0.0 | 0.0 | 77.0 | 0.0 | 11 | Sales & Marketing | region_7 | Bachelor's | f | sourcing | 1.0 | 35.0 | 5.0 | 3.0 | 1.0 | 0.0 | 50.0 |
| employee_id         | department   | region      | education        | gender | recruitment_channel | no.of_trainings | age                 | previous_year_rating | length_of_service | KPIs met<br>360°     | awards_won <sup>3</sup> | avg_training_score | is_promoted             |                    |             |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |           |            |   |          |     |      |     |     |     |     |      |     |   |                   |           |            |   |       |     |      |     |      |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |           |          |            |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |            |           |                  |   |          |     |      |     |     |     |     |      |     |   |           |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |    |            |           |      |   |          |     |      |      |     |     |     |      |     |    |                   |          |            |   |          |     |      |     |     |     |     |      |
| 0                   | Sales & Marketing  | region_7    | Master's & above | f      | sourcing            | 1.0             | 36.0                | 5.0                  | 8.0               | 1.0                  | 0.0                     | 49.0               | 0.0                     |                    |             |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |           |            |   |          |     |      |     |     |     |     |      |     |   |                   |           |            |   |       |     |      |     |      |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |           |          |            |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |            |           |                  |   |          |     |      |     |     |     |     |      |     |   |           |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |    |            |           |      |   |          |     |      |      |     |     |     |      |     |    |                   |          |            |   |          |     |      |     |     |     |     |      |
| 1                   | Operations   | region_22   | Bachelor's       | m      | other               | 1.0             | 30.0                | 5.0                  | 4.0               | 0.0                  | 0.0                     | 60.0               | 0.0                     |                    |             |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |           |            |   |          |     |      |     |     |     |     |      |     |   |                   |           |            |   |       |     |      |     |      |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |           |          |            |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |            |           |                  |   |          |     |      |     |     |     |     |      |     |   |           |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |    |            |           |      |   |          |     |      |      |     |     |     |      |     |    |                   |          |            |   |          |     |      |     |     |     |     |      |
| 2                   | Sales & Marketing  | region_19   | Bachelor's       | m      | sourcing            | 1.0             | 34.0                | 3.0                  | 7.0               | 0.0                  | 0.0                     | 60.0               | 0.0                     |                    |             |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |           |            |   |          |     |      |     |     |     |     |      |     |   |                   |           |            |   |       |     |      |     |      |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |           |          |            |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |            |           |                  |   |          |     |      |     |     |     |     |      |     |   |           |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |    |            |           |      |   |          |     |      |      |     |     |     |      |     |    |                   |          |            |   |          |     |      |     |     |     |     |      |
| 3                   | Sales & Marketing  | region_23   | Bachelor's       | m      | other               | 2.0             | 39.0                | 1.0                  | 10.0              | 0.0                  | 0.0                     | 50.0               | 0.0                     |                    |             |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |           |            |   |          |     |      |     |     |     |     |      |     |   |                   |           |            |   |       |     |      |     |      |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |           |          |            |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |            |           |                  |   |          |     |      |     |     |     |     |      |     |   |           |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |    |            |           |      |   |          |     |      |      |     |     |     |      |     |    |                   |          |            |   |          |     |      |     |     |     |     |      |
| 4                   | Technology   | region_26   | Bachelor's       | m      | other               | 1.0             | 45.0                | 3.0                  | 2.0               | 0.0                  | 0.0                     | 73.0               | 0.0                     |                    |             |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |           |            |   |          |     |      |     |     |     |     |      |     |   |                   |           |            |   |       |     |      |     |      |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |           |          |            |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |            |           |                  |   |          |     |      |     |     |     |     |      |     |   |           |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |    |            |           |      |   |          |     |      |      |     |     |     |      |     |    |                   |          |            |   |          |     |      |     |     |     |     |      |
| 5                   | Analytics  | region_2    | Bachelor's       | m      | sourcing            | 2.0             | 31.0                | 3.0                  | 7.0               | 0.0                  | 0.0                     | 85.0               | 0.0                     |                    |             |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |           |            |   |          |     |      |     |     |     |     |      |     |   |                   |           |            |   |       |     |      |     |      |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |           |          |            |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |            |           |                  |   |          |     |      |     |     |     |     |      |     |   |           |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |    |            |           |      |   |          |     |      |      |     |     |     |      |     |    |                   |          |            |   |          |     |      |     |     |     |     |      |
| 6                   | Operations   | region_20   | Bachelor's       | f      | other               | 1.0             | 31.0                | 3.0                  | 5.0               | 0.0                  | 0.0                     | 59.0               | 0.0                     |                    |             |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |           |            |   |          |     |      |     |     |     |     |      |     |   |                   |           |            |   |       |     |      |     |      |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |           |          |            |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |            |           |                  |   |          |     |      |     |     |     |     |      |     |   |           |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |    |            |           |      |   |          |     |      |      |     |     |     |      |     |    |                   |          |            |   |          |     |      |     |     |     |     |      |
| 7                   | Operations   | region_34   | Master's & above | m      | sourcing            | 1.0             | 33.0                | 3.0                  | 6.0               | 0.0                  | 0.0                     | 63.0               | 0.0                     |                    |             |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |           |            |   |          |     |      |     |     |     |     |      |     |   |                   |           |            |   |       |     |      |     |      |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |           |          |            |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |            |           |                  |   |          |     |      |     |     |     |     |      |     |   |           |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |    |            |           |      |   |          |     |      |      |     |     |     |      |     |    |                   |          |            |   |          |     |      |     |     |     |     |      |
| 8                   | Analytics  | region_20   | Bachelor's       | m      | other               | 1.0             | 20.0                | 4.0                  | 5.0               | 0.0                  | 0.0                     | 89.0               | 0.0                     |                    |             |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |           |            |   |          |     |      |     |     |     |     |      |     |   |                   |           |            |   |       |     |      |     |      |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |           |          |            |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |            |           |                  |   |          |     |      |     |     |     |     |      |     |   |           |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |    |            |           |      |   |          |     |      |      |     |     |     |      |     |    |                   |          |            |   |          |     |      |     |     |     |     |      |
| 9                   | Sales & Marketing  | region_1    | Master's & above | m      | sourcing            | 1.0             | 32.0                | 5.0                  | 6.0               | 1.0                  | 0.0                     | 64.0               | 0.0                     |                    |             |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |           |            |   |          |     |      |     |     |     |     |      |     |   |                   |           |            |   |       |     |      |     |      |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |           |          |            |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |            |           |                  |   |          |     |      |     |     |     |     |      |     |   |           |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |    |            |           |      |   |          |     |      |      |     |     |     |      |     |    |                   |          |            |   |          |     |      |     |     |     |     |      |
| 10                  | Technology   | region_23   | High             | m      | sourcing            | 1.0             | 30.0                | High                 | 1.0               | 0.0                  | 0.0                     | 77.0               | 0.0                     |                    |             |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |           |            |   |          |     |      |     |     |     |     |      |     |   |                   |           |            |   |       |     |      |     |      |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |           |          |            |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |            |           |                  |   |          |     |      |     |     |     |     |      |     |   |           |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |    |            |           |      |   |          |     |      |      |     |     |     |      |     |    |                   |          |            |   |          |     |      |     |     |     |     |      |
| 11                  | Sales & Marketing  | region_7    | Bachelor's       | f      | sourcing            | 1.0             | 35.0                | 5.0                  | 3.0               | 1.0                  | 0.0                     | 50.0               | 1.0                     |                    |             |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |           |            |   |          |     |      |     |     |     |     |      |     |   |                   |           |            |   |       |     |      |     |      |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |           |          |            |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |            |           |                  |   |          |     |      |     |     |     |     |      |     |   |           |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |    |            |           |      |   |          |     |      |      |     |     |     |      |     |    |                   |          |            |   |          |     |      |     |     |     |     |      |
|                     | =  |             |                  |        |                     |                 |                     |                      |                   |                      |                         |                    |                         |                    |             |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |           |            |   |          |     |      |     |     |     |     |      |     |   |                   |           |            |   |       |     |      |     |      |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |           |          |            |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |            |           |                  |   |          |     |      |     |     |     |     |      |     |   |           |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |    |            |           |      |   |          |     |      |      |     |     |     |      |     |    |                   |          |            |   |          |     |      |     |     |     |     |      |
| Univariate Analysis |    |             |                  |        |                     |                 |                     |                      |                   |                      |                         |                    |                         |                    |             |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |           |            |   |          |     |      |     |     |     |     |      |     |   |                   |           |            |   |       |     |      |     |      |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |           |          |            |   |          |     |      |     |     |     |     |      |     |   |            |           |            |   |       |     |      |     |     |     |     |      |     |   |            |           |                  |   |          |     |      |     |     |     |     |      |     |   |           |           |            |   |       |     |      |     |     |     |     |      |     |   |                   |          |                  |   |          |     |      |     |     |     |     |      |     |    |            |           |      |   |          |     |      |      |     |     |     |      |     |    |                   |          |            |   |          |     |      |     |     |     |     |      |



|                       |  |
|-----------------------|--|
| Handling Missing Data | <pre> # Replacing nan with mode  print(df['education'].value_counts()) df['education']=df['education'].fillna(df['education'].mode()[0])  education Bachelor's      39078 Master's &amp; above 14925 Below Secondary   805 Name: count, dtype: int64  [ ] # Replacing nan with mode  print(df['previous_year_rating'].value_counts()) df['previous_year_rating']=df['previous_year_rating'].fillna(df['previous_year_rating'].mode()[0])  previous_year_rating 3.0      18618 5.0      11741 4.0       9877 1.0       6223 2.0       4225 Name: count, dtype: int64 </pre> |
| Data Transformation   | <pre> # Feature mapping is done on education column  from sklearn.preprocessing import LabelEncoder  df['education'] = df['education'].replace(('Below Secondary', 'Bachelor', 'Master', ' &amp; above'), ('0', '1', '2', '3'))  lb = LabelEncoder()  df['department'] = lb.fit_transform(df['department']) </pre>   |
| Feature Engineering   | Attached the codes in the final submission   |
| Save Processed Data   | -  |