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"Description:- Predicting the age of abalone from physical measurements. The age of abalone is\n",

"determined by cutting the shell through the cone, staining it, and counting the number of rings through\n",

"a microscope -- a boring and time-consuming task. Other measurements, which are easier to obtain,\n",

"are used to predict age. Further information, such as weather patterns and location (hence food\n",

"availability) may be required to solve the problem.\n",

"\n",

"# Building a Regression Model\n",

"1. Download the dataset\n",

"2. Load the dataset into the tool.\n",

"3. Perform Below Visualizations.\n",

" \n",

" ∙ Univariate Analysis\n",

" \n",

" ∙ Bi-Variate Analysis\n",

" \n",

" ∙ Multi-Variate Analysis\n",

"4. Perform descriptive statistics on the dataset.\n",

"5. Check for Missing values and deal with them.\n",

"6. Find the outliers and replace them outliers\n",

"7. Check for Categorical columns and perform encoding. \n",

"8. Split the data into dependent and independent variables. \n",

"9. Scale the independent variables\n",

"10. Split the data into training and testing\n",

"11. Build the Model\n",

"12. Train the Model\n",

"13. Test the Model\n",

"14. Measure the performance using Metrics."

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"import seaborn as sb\n",

"import plotly.express as px"

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"2 F 0.530 0.420 0.135 0.6770 0.2565 \n",

"3 M 0.440 0.365 0.125 0.5160 0.2155 \n",

"4 I 0.330 0.255 0.080 0.2050 0.0895 \n",

"... .. ... ... ... ... ... \n",

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" Viscera weight Shell weight Rings \n",

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" buttonEl.style.display =\n",

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"\n",

" async function convertToInteractive(key) {\n",

" const element = document.querySelector('#df-6cde43e4-ad75-42d3-bb9e-5b5f71b24e84');\n",

" const dataTable =\n",

" await google.colab.kernel.invokeFunction('convertToInteractive',\n",

" [key], {});\n",

" if (!dataTable) return;\n",

"\n",

" const docLinkHtml = 'Like what you see? Visit the ' +\n",

" '<a target=\"\_blank\" href=https://colab.research.google.com/notebooks/data\_table.ipynb>data table notebook</a>'\n",

" + ' to learn more about interactive tables.';\n",

" element.innerHTML = '';\n",

" dataTable['output\_type'] = 'display\_data';\n",

" await google.colab.output.renderOutput(dataTable, element);\n",

" const docLink = document.createElement('div');\n",

" docLink.innerHTML = docLinkHtml;\n",

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"plt.xlabel('No. of Rings')\n",

"plt.ylabel('Gender')"

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" 3 Height 4177 non-null float64\n",

" 4 Whole weight 4177 non-null float64\n",

" 5 Shucked weight 4177 non-null float64\n",

" 6 Viscera weight 4177 non-null float64\n",

" 7 Shell weight 4177 non-null float64\n",

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"min 0.075000 0.055000 0.000000 0.002000 0.001000 \n",

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"50% 0.545000 0.425000 0.140000 0.799500 0.336000 \n",

"75% 0.615000 0.480000 0.165000 1.153000 0.502000 \n",

"max 0.815000 0.650000 1.130000 2.825500 1.488000 \n",

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" <td>0.139516</td>\n",

" <td>0.828742</td>\n",

" <td>0.359367</td>\n",

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" <td>0.238831</td>\n",

" <td>9.933684</td>\n",

" </tr>\n",

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" <td>0.041827</td>\n",

" <td>0.490389</td>\n",

" <td>0.221963</td>\n",

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" <td>0.139203</td>\n",

" <td>3.224169</td>\n",

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" <th>min</th>\n",

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" <td>0.055000</td>\n",

" <td>0.000000</td>\n",

" <td>0.002000</td>\n",

" <td>0.001000</td>\n",

" <td>0.000500</td>\n",

" <td>0.001500</td>\n",

" <td>1.000000</td>\n",

" </tr>\n",

" <tr>\n",

" <th>25%</th>\n",

" <td>0.450000</td>\n",

" <td>0.350000</td>\n",

" <td>0.115000</td>\n",

" <td>0.441500</td>\n",

" <td>0.186000</td>\n",

" <td>0.093500</td>\n",

" <td>0.130000</td>\n",

" <td>8.000000</td>\n",

" </tr>\n",

" <tr>\n",

" <th>50%</th>\n",

" <td>0.545000</td>\n",

" <td>0.425000</td>\n",

" <td>0.140000</td>\n",

" <td>0.799500</td>\n",

" <td>0.336000</td>\n",

" <td>0.171000</td>\n",

" <td>0.234000</td>\n",

" <td>9.000000</td>\n",

" </tr>\n",

" <tr>\n",

" <th>75%</th>\n",

" <td>0.615000</td>\n",

" <td>0.480000</td>\n",

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" <td>1.153000</td>\n",

" <td>0.502000</td>\n",

" <td>0.253000</td>\n",

" <td>0.329000</td>\n",

" <td>11.000000</td>\n",

" </tr>\n",

" <tr>\n",

" <th>max</th>\n",

" <td>0.815000</td>\n",

" <td>0.650000</td>\n",

" <td>1.130000</td>\n",

" <td>2.825500</td>\n",

" <td>1.488000</td>\n",

" <td>0.760000</td>\n",

" <td>1.005000</td>\n",

" <td>29.000000</td>\n",

" </tr>\n",

" </tbody>\n",

"</table>\n",

"</div>\n",

" <button class=\"colab-df-convert\" onclick=\"convertToInteractive('df-318d9da4-c294-4813-96b0-4ac83a6cdc2d')\"\n",

" title=\"Convert this dataframe to an interactive table.\"\n",

" style=\"display:none;\">\n",

" \n",

" <svg xmlns=\"http://www.w3.org/2000/svg\" height=\"24px\"viewBox=\"0 0 24 24\"\n",

" width=\"24px\">\n",

" <path d=\"M0 0h24v24H0V0z\" fill=\"none\"/>\n",

" <path d=\"M18.56 5.44l.94 2.06.94-2.06 2.06-.94-2.06-.94-.94-2.06-.94 2.06-2.06.94zm-11 1L8.5 8.5l.94-2.06 2.06-.94-2.06-.94L8.5 2.5l-.94 2.06-2.06.94zm10 10l.94 2.06.94-2.06 2.06-.94-2.06-.94-.94-2.06-.94 2.06-2.06.94z\"/><path d=\"M17.41 7.96l-1.37-1.37c-.4-.4-.92-.59-1.43-.59-.52 0-1.04.2-1.43.59L10.3 9.45l-7.72 7.72c-.78.78-.78 2.05 0 2.83L4 21.41c.39.39.9.59 1.41.59.51 0 1.02-.2 1.41-.59l7.78-7.78 2.81-2.81c.8-.78.8-2.07 0-2.86zM5.41 20L4 18.59l7.72-7.72 1.47 1.35L5.41 20z\"/>\n",

" </svg>\n",

" </button>\n",

" \n",

" <style>\n",

" .colab-df-container {\n",

" display:flex;\n",

" flex-wrap:wrap;\n",

" gap: 12px;\n",

" }\n",

"\n",

" .colab-df-convert {\n",

" background-color: #E8F0FE;\n",

" border: none;\n",

" border-radius: 50%;\n",

" cursor: pointer;\n",

" display: none;\n",

" fill: #1967D2;\n",

" height: 32px;\n",

" padding: 0 0 0 0;\n",

" width: 32px;\n",

" }\n",

"\n",

" .colab-df-convert:hover {\n",

" background-color: #E2EBFA;\n",

" box-shadow: 0px 1px 2px rgba(60, 64, 67, 0.3), 0px 1px 3px 1px rgba(60, 64, 67, 0.15);\n",

" fill: #174EA6;\n",

" }\n",

"\n",

" [theme=dark] .colab-df-convert {\n",

" background-color: #3B4455;\n",

" fill: #D2E3FC;\n",

" }\n",

"\n",

" [theme=dark] .colab-df-convert:hover {\n",

" background-color: #434B5C;\n",

" box-shadow: 0px 1px 3px 1px rgba(0, 0, 0, 0.15);\n",

" filter: drop-shadow(0px 1px 2px rgba(0, 0, 0, 0.3));\n",

" fill: #FFFFFF;\n",

" }\n",

" </style>\n",

"\n",

" <script>\n",

" const buttonEl =\n",

" document.querySelector('#df-318d9da4-c294-4813-96b0-4ac83a6cdc2d button.colab-df-convert');\n",

" buttonEl.style.display =\n",

" google.colab.kernel.accessAllowed ? 'block' : 'none';\n",

"\n",

" async function convertToInteractive(key) {\n",

" const element = document.querySelector('#df-318d9da4-c294-4813-96b0-4ac83a6cdc2d');\n",

" const dataTable =\n",

" await google.colab.kernel.invokeFunction('convertToInteractive',\n",

" [key], {});\n",

" if (!dataTable) return;\n",

"\n",

" const docLinkHtml = 'Like what you see? Visit the ' +\n",

" '<a target=\"\_blank\" href=https://colab.research.google.com/notebooks/data\_table.ipynb>data table notebook</a>'\n",

" + ' to learn more about interactive tables.';\n",

" element.innerHTML = '';\n",

" dataTable['output\_type'] = 'display\_data';\n",

" await google.colab.output.renderOutput(dataTable, element);\n",

" const docLink = document.createElement('div');\n",

" docLink.innerHTML = docLinkHtml;\n",

" element.appendChild(docLink);\n",

" }\n",

" </script>\n",

" </div>\n",

" </div>\n",

" "

]

},

"metadata": {},

"execution\_count": 11

}

]

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"\n",

"There is no missing values\n"

],

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"id": "9qmznP9T\_-G0"

}

},

{

"cell\_type": "code",

"source": [

"data.isnull().any()"

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"Sex False\n",

"Length False\n",

"Diameter False\n",

"Height False\n",

"Whole weight False\n",

"Shucked weight False\n",

"Viscera weight False\n",

"Shell weight False\n",

"Rings False\n",

"dtype: bool"

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}

]

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"#6. Find the outliers and replace them outliers\n",

"\n",

"The dataset does not have a outliers"

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}

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"fig = px.histogram(data, x='Whole weight')\n",

"fig.show()"

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"outputId": "c742f849-6d33-4d90-cd28-f98db1af26d1"

},

"execution\_count": 54,

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{

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"data": {

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"<head><meta charset=\"utf-8\" /></head>\n",

"<body>\n",

" <div> <script src=\"https://cdnjs.cloudflare.com/ajax/libs/mathjax/2.7.5/MathJax.js?config=TeX-AMS-MML\_SVG\"></script><script type=\"text/javascript\">if (window.MathJax) {MathJax.Hub.Config({SVG: {font: \"STIX-Web\"}});}</script> <script type=\"text/javascript\">window.PlotlyConfig = {MathJaxConfig: 'local'};</script>\n",

" <script src=\"https://cdn.plot.ly/plotly-2.8.3.min.js\"></script> <div id=\"7e6c2efd-afd5-4c68-9e1d-3e48196ba495\" class=\"plotly-graph-div\" style=\"height:525px; width:100%;\"></div> <script type=\"text/javascript\"> window.PLOTLYENV=window.PLOTLYENV || {}; if (document.getElementById(\"7e6c2efd-afd5-4c68-9e1d-3e48196ba495\")) { Plotly.newPlot( \"7e6c2efd-afd5-4c68-9e1d-3e48196ba495\", [{\"alignmentgroup\":\"True\",\"bingroup\":\"x\",\"hovertemplate\":\"Whole weight=%{x}<br>count=%{y}<extra></extra>\",\"legendgroup\":\"\",\"marker\":{\"color\":\"#636efa\",\"pattern\":{\"shape\":\"\"}},\"name\":\"\",\"offsetgroup\":\"\",\"orientation\":\"v\",\"showlegend\":false,\"x\":[0.514,0.2255,0.677,0.516,0.205,0.3515,0.7775,0.768,0.5095,0.8945,0.6065,0.406,0.5415,0.6845,0.4755,0.6645,0.2905,0.451,0.2555,0.381,0.2455,0.2255,0.9395,0.7635,1.1615,0.9285,0.9955,0.931,0.9365,0.8635,0.9975,1.639,1.338,1.798,1.7095,0.4795,1.217,0.5225,0.883,0.3275,0.425,0.8515,0.07,0.042,0.042,0.203,0.5795,0.4605,0.161,0.8355,0.595,0.303,0.5415,0.4775,0.385,0.6615,0.4425,0.5895,0.086,0.583,0.4115,0.625,0.6965,0.3785,0.58,0.48,0.915,1.285,0.5305,0.151,0.7665,0.353,1.247,1.185,1.098,1.0075,0.944,0.922,0.788,1.1025,0.941,1.615,0.9885,1.3175,1.013,1.295,1.195,0.8645,0.517,0.9775,0.8115,0.755,1.115,1.262,1.494,1.606,0.725,0.523,0.5225,0.5785,0.2315,0.843,0.883,0.724,1.1735,0.727,0.802,0.6675,0.6335,0.3635,0.5415,0.431,0.3325,0.393,0.6935,0.5915,0.6125,0.402,0.8825,0.2605,0.4205,0.2535,0.766,0.214,0.1755,0.073,0.238,0.2505,1.7255,1.959,1.262,0.4035,0.1915,0.211,0.0975,0.406,0.156,0.2005,0.3555,0.253,0.826,0.741,1.3445,0.797,0.5175,0.549,0.515,0.127,0.0315,0.03,1.053,1.1185,1.3715,1.0565,0.9885,0.722,0.994,1.514,0.9075,1.124,1.056,1.222,1.2445,2.141,1.752,2.55,2.124,1.842,1.981,1.6185,1.9565,0.775,1.065,0.776,0.048,0.1785,0.125,0.1435,0.0465,0.97,0.9395,1.368,1.0235,1.0165,1.5675,1.218,1.0525,1.383,1.199,0.9325,1.1595,1.0225,0.927,0.22,0.8145,0.772,0.644,1.3035,0.922,0.922,0.4165,0.825,0.63,0.8155,0.369,0.482,0.315,0.3795,0.8325,0.2655,0.6345,0.181,0.38,0.6155,0.66,0.8025,0.46,0.324,0.501,0.32,0.455,0.5175,0.5755,0.485,0.3265,0.45,0.3055,0.205,1.1015,0.783,0.836,0.9025,1.4455,0.1155,0.435,0.124,0.002,0.013,0.008,0.021,0.9425,0.1,0.0645,0.1275,0.1655,0.174,0.1585,0.1975,0.156,0.2135,0.1715,1.1235,1.0605,1.094,1.2415,1.011,1.07,0.8975,1.415,1.1015,0.928,0.865,0.8945,0.095,0.1205,0.639,0.895,0.2925,0.6355,0.4995,1.779,1.187,1.219,1.525,1.259,1.844,1.3485,1.642,1.484,0.712,0.8415,0.2415,0.4495,0.6295,0.9565,0.879,0.699,0.6445,0.4775,0.8105,0.996,1.2765,1.116,1.013,1.0575,0.128,0.1105,0.1065,0.549,0.234,0.3485,0.892,0.252,0.217,0.472,0.037,0.0215,1.5415,0.7605,0.9055,1.2435,0.971,1.3305,1.2255,1.3,0.4585,1.242,0.3675,0.8365,0.172,0.0965,0.038,0.2845,0.1055,0.222,0.251,0.1755,0.6435,0.241,0.2255,0.5955,0.3185,0.121,0.0705,1.974,1.3415,1.0875,1.283,1.325,1.0035,1.165,1.3475,1.274,0.568,0.746,0.707,0.756,0.2,0.2715,1.2,1.153,0.8685,0.9535,0.93,1.275,2.13,1.587,1.8085,2.499,1.768,1.227,0.997,1.4225,1.029,1.186,1.016,0.887,1.0735,1.13,1.719,1.566,1.7605,1.787,1.31,1.343,1.7345,1.1775,1.077,0.995,1.1085,1.1405,0.791,0.663,0.5565,0.8445,0.4925,0.7385,0.482,0.609,0.471,0.3215,0.593,0.5615,0.25,0.1995,0.302,0.7155,0.5865,0.6765,0.987,0.5885,0.7225,0.4335,0.6935,0.365,0.8425,0.479,0.911,0.915,0.827,1.1045,0.945,0.9935,0.8565,1.2385,1.0325,1.3135,1.352,1.005,0.625,1.5015,0.529,0.5785,0.101,0.092,1.068,1.0915,1.015,0.943,1.0475,0.9555,1.036,0.9065,0.7505,0.366,0.662,0.217,0.252,0.3055,0.6885,0.2335,0.192,0.85,0.2715,0.3635,0.714,0.9815,0.9265,1.098,0.8205,1.891,1.41,1.4385,0.9245,1.2915,0.8375,1.221,0.199,0.2965,0.7085,0.2665,0.9915,0.0715,0.0545,0.0735,0.0235,1.3905,1.388,1.7445,1.4385,0.7835,0.646,0.3575,0.627,0.7715,0.7395,0.421,1.347,1.756,1.32,1.8075,0.9325,0.849,0.9955,1.0115,0.908,0.92,1.2415,0.8075,1.0595,1.073,0.921,1.2895,1.2635,1.369,0.953,1.248,1.0105,1.0385,0.874,0.854,1.1835,1.115,1.129,1.1745,1.105,0.8395,1.055,0.889,0.8735,1.1095,0.5185,0.6725,0.146,0.08,0.1,0.2795,0.0915,0.147,0.203,0.0385,0.1885,0.218,0.035,0.0545,0.024,0.0155,0.733,0.9715,0.24,0.752,0.458,0.4705,0.38,0.4985,0.454,0.5775,0.1165,0.094,0.2705,0.604,0.415,0.2885,0.3615,0.257,0.1555,0.08,0.0425,0.795,0.875,1.1625,0.9885,0.8,0.514,0.591,0.6265,0.795,1.1905,1.326,0.66,0.364,0.659,0.452,0.7335,0.5465,0.179,0.581,0.406,0.1085,0.387,0.474,0.443,1.066,0.9535,0.9665,1.133,0.9175,0.982,0.8865,1.3675,1.233,0.806,1.4635,0.4935,0.363,0.6655,0.6805,0.8285,0.4625,0.3095,0.745,0.25,0.874,1.514,0.6995,0.8525,0.7135,0.939,1.054,0.981,0.926,0.286,0.265,0.4885,0.5555,0.425,0.195,0.458,0.228,0.1775,0.4085,0.032,0.155,0.4775,0.525,0.3865,0.433,0.17,0.1295,0.0515,0.169,0.673,0.6785,0.498,0.498,0.658,0.322,0.2815,0.944,0.1835,0.49,0.391,0.467,0.5225,0.2105,0.168,0.258,0.1905,0.487,0.5735,0.173,1.1785,0.9,0.1875,0.3715,0.347,0.1145,0.777,0.4885,0.447,0.079,0.1665,0.466,0.1345,0.2305,0.129,0.97,1.14,1.3165,0.9585,1.626,0.781,0.3675,0.281,0.412,0.2245,0.4835,0.605,0.9175,0.5425,0.6175,0.655,0.8115,0.573,0.7865,0.64,0.74,0.5945,0.8165,0.2225,0.2295,0.5725,0.3915,0.8345,0.6515,0.909,0.8045,0.927,0.7305,0.9555,0.636,0.0865,0.3865,0.283,0.019,0.1285,0.0175,0.1165,0.444,0.3515,0.2905,0.536,0.4525,0.316,0.417,0.417,0.203,0.207,0.2765,0.1105,0.176,0.2465,0.1135,0.201,0.1915,0.1035,0.0975,0.0765,0.0265,0.015,0.018,1.0575,1.092,0.99,0.488,0.5005,0.297,0.525,0.77,0.6515,0.8295,0.879,0.823,0.656,0.8665,0.6565,0.669,0.6435,0.862,0.3795,0.835,0.2065,0.7365,0.8175,0.8425,1.001,1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19,1.741,1.6115,1.7825,1.684,1.858,1.675,2.1055,2.21,1.8725,1.893,0.0475,0.101,0.121,0.117,0.1465,0.168,0.18,0.1775,0.1985,0.2,0.2205,0.1845,0.2225,0.2175,0.2165,0.243,0.237,0.2365,0.257,0.308,0.252,0.281,0.2225,0.304,0.28,0.313,0.317,0.303,0.3295,0.367,0.3245,0.4195,0.457,0.4,0.4255,0.4365,0.393,0.499,0.6325,0.4285,0.4905,0.474,0.536,0.464,0.6025,0.4615,0.624,0.4715,0.602,0.616,0.5955,0.559,0.6025,0.6065,0.4725,0.4745,0.6635,0.5705,0.646,0.5545,0.845,0.664,0.615,0.654,0.707,0.5965,0.6255,0.555,0.8365,0.657,0.836,0.742,0.8195,0.972,0.6275,0.7205,0.686,0.686,0.543,0.717,0.7625,0.639,0.816,0.7815,0.7665,0.5585,0.765,0.9005,0.8225,0.7235,0.849,0.743,0.863,0.802,0.831,0.7805,0.795,0.848,0.833,0.867,0.7405,0.867,0.7965,1.116,0.78,0.985,0.9965,0.8015,0.807,1.0305,0.839,0.9615,0.834,1.0335,0.798,0.7095,0.913,1.207,1.022,0.9015,0.9,0.838,0.959,0.8335,0.9735,1.13,0.9165,0.9175,1.0645,1.059,1.194,0.9775,0.884,0.8025,0.991,0.974,1.434,0.983,1.0725,1.2405,1.022,1.1155,0.9225,1.1185,1.2795,1.0175,1.224,1.154,1.3255,1.221,1.139,1.066,1.2215,0.8565,0.924,1.266,1.0405,1.1165,1.0845,1.0985,1.1955,1.362,1.044,1.0915,1.1965,1.1745,1.233,1.2695,1.489,1.4345,1.2435,1.2615,1.2235,1.247,1.707,1.1605,1.286,1.5595,1.4745,1.226,1.33,1.2415,1.3375,1.363,1.2215,1.371,1.337,1.274,1.488,1.3835,1.274,1.043,1.3485,1.4405,1.3195,1.5175,1.5505,1.6375,1.443,1.289,1.2915,1.3725,1.2975,1.2585,1.39,1.32,1.566,1.619,1.2835,1.382,1.4535,1.6075,1.3735,1.638,1.569,1.8565,1.773,1.58,2.009,1.9805,1.5805,2.015,1.8275,2.125,1.445,2.1425,1.9425,1.747,2.119,1.938,2.2205,2.5155,2.7795,0.2315,0.394,0.597,0.564,0.5965,0.414,0.422,0.82,0.434,0.7615,0.5795,0.5205,0.968,0.869,0.8795,1.0615,0.9225,1.007,0.9605,0.65,0.7545,0.771,1.0835,0.8935,1.358,1.1185,1.205,1.3405,1.02,1.025,0.8145,1.48,0.953,0.8915,1.3005,1.038,1.2525,1.15,1.1135,1.1155,1.0865,1.254,1.169,1.172,1.1845,1.0725,1.3815,1.6125,1.7395,1.5475,1.4245,1.3405,1.4465,1.5845,1.679,1.726,1.5395,2.073,1.5865,2.069,0.027,0.0555,0.1275,0.1885,0.2,0.197,0.223,0.2215,0.2665,0.269,0.2805,0.3305,0.2815,0.2805,0.311,0.368,0.3405,0.3245,0.38,0.335,0.3215,0.358,0.445,0.487,0.4535,0.568,0.5155,0.457,0.5095,0.5,0.494,0.5605,0.599,0.7045,0.7005,0.7125,0.6725,0.5785,0.5185,0.6375,0.5805,0.6645,0.581,0.596,0.6965,0.6095,0.677,0.7245,0.575,0.632,1.0015,0.9455,0.6555,0.6255,0.8145,0.687,0.7995,0.804,0.7495,0.599,0.7075,0.738,0.837,0.832,0.8305,0.667,0.9355,0.8445,0.895,0.8715,1.0005,0.832,0.9415,0.88,0.803,0.785,0.9765,0.992,1.013,0.876,1.099,0.8715,0.8245,0.7955,0.857,0.8265,0.925,1.0465,0.7905,0.8295,0.886,0.97,1.1805,0.99,1.133,1.071,0.862,1.1155,1.031,1.1185,0.957,1.1785,1.0285,1.0875,1.255,1.219,1.035,1.195,1.062,1.5145,1.309,1.0295,1.0485,1.331,1.1565,1.09,1.354,0.984,1.2525,1.2695,1.3405,1.2895,1.195,1.273,1.229,1.1895,1.1145,1.3115,1.1,1.1285,1.4195,1.6195,1.32,1.5535,1.238,1.189,1.375,1.412,1.348,1.1445,1.4415,1.218,1.2475,1.2695,1.429,1.4015,1.312,1.473,1.623,1.534,1.3845,1.6915,1.5715,1.773,1.4405,1.6245,1.866,1.6705,2.081,1.6195,1.8325,2.173,0.029,0.0195,0.0465,0.1195,0.0895,0.0935,0.1115,0.1195,0.097,0.133,0.1745,0.1695,0.17,0.1605,0.271,0.2185,0.196,0.226,0.22,0.3,0.2875,0.316,0.3675,0.3675,0.346,0.4955,0.4675,0.522,0.441,0.5185,0.653,0.5915,0.4825,0.6855,0.6335,0.6875,0.741,0.6355,0.8395,0.9205,0.8215,0.9255,0.8295,1.063,1.115,0.837,0.982,1.112,1.3485,1.5655,0.086,0.1065,0.132,0.1075,0.1745,0.152,0.2755,0.293,0.368,0.312,0.336,0.355,0.379,0.378,0.4655,0.594,0.4935,0.4595,0.4955,0.4325,0.689,0.5465,0.617,0.538,0.7815,0.6355,0.6435,0.5115,0.738,0.699,0.7655,0.7505,0.844,0.8705,0.668,0.83,0.8685,0.839,1.079,0.919,1.1345,0.909,1.2435,1.056,1.2095,1.238,1.644,1.7725,1.2525,1.761,1.3165,1.914,2.1,1.6895,2.032,0.66,0.7455,0.616,0.2825,0.3355,0.651,0.361,0.4775,0.3465,0.25,0.66,0.315,0.276,0.5395,1.04,1.041,1.6885,2.1835,1.2105,0.166,0.452,0.7185,0.232,0.0105,0.0275,0.1445,0.282,0.608,0.433,0.3295,0.4555,0.4585,0.275,0.335,0.4265,0.5765,0.127,1.1505,0.8915,0.97,0.18,0.6985,0.4585,0.4005,0.7145,0.932,0.966,0.9995,1.496,0.5065,0.1735,0.3945,0.4665,0.401,0.3455,0.5205,0.4935,0.3245,0.106,0.4415,1.966,0.3025,0.1225,0.879,1.2275,1.2715,1.806,0.8085,1.3905,1.8465,2.1995,1.817,0.897,0.3245,1.136,0.2735,0.2405,0.1545,0.0145,0.1185,0.0295,0.0385,0.799,1.1845,0.925,1.098,1.071,0.975,1.283,1.0595,0.9195,0.9295,0.8085,0.1485,0.4475,0.6865,0.6335,0.547,0.585,0.927,1.4935,1.0405,0.0605,0.3675,0.099,0.233,0.3625,0.081,1.596,1.4005,1.406,0.9245,1.36,0.43,0.1365,0.14,0.4215,1.5765,1.2125,1.6305,1.142,1.366,1.539,0.445,0.5725,0.19,0.764,0.853,0.5885,0.7875,1.035,1.352,0.958,0.797,0.857,0.2235,0.086,0.692,0.2225,0.7575,0.729,0.903,1.0965,0.903,1.229,1.106,1.171,0.444,0.4755,0.388,0.3785,0.486,0.5265,0.2275,0.5105,0.3105,0.543,0.2225,0.998,1.5455,1.2675,1.1,1.4285,1.793,0.6185,0.5825,0.7485,0.406,1.1005,0.869,0.955,0.9215,1.456,0.893,2.226,1.2125,1.0675,0.8525,0.8615,1.162,0.8705,1.598,1.406,2.033,1.259,1.0935,1.1805,0.7175,0.7575,0.487,0.5705,0.6905,0.4475,0.347,0.352,0.7145,0.3315,0.18,0.974,0.185,0.563,0.3215,0.179,0.702,0.8045,0.8075,0.578,0.385,0.585,0.6375,0.813,0.5735,0.94,1.008,0.775,1.1445,0.6,0.515,0.5795,0.384,0.2965,0.137,0.991,0.925,0.805,0.8915,0.769,0.6185,0.6515,0.2875,0.5545,0.7365,0.306,1.496,0.3605,0.3045,0.592,0.7995,0.5825,0.3435,0.906,0.6295,1.5515,2.526,1.103,0.957,0.86,1.62,1.407,0.9,0.1455,0.075,0.0235,1.247,1.7265,0.8025,0.764,0.8645,0.4715,0.631,0.9455,1.3185,1.7265,1.081,0.9025,1.1415,1.027,1.3445,1.449,0.7745,0.7895,1.3665,1.0295,1.031,1.065,1.885,1.2425,1.969,0.9445,0.354,0.023,0.3575,0.5965,0.383,0.2065,0.382,0.6315,0.3285,0.2165,0.0305,0.024,0.7365,0.6005,0.4285,0.496,0.6195,0.567,0.6505,0.4495,0.4485,0.241,0.197,0.1425,1.2395,1.0385,0.972,1.3315,0.762,0.775,0.437,0.6985,0.435,0.1295,0.8435,1.25,1.017,1.411,1.208,1.0705,0.5895,0.537,0.15,0.651,0.28,0.287,0.3525,0.12,0.494,0.4765,0.2145,0.595,0.4805,0.321,0.096,0.9315,0.782,0.0945,0.6695,0.213,0.525,1.312,1.087,1.523,1.319,0.579,0.8175,0.17,0.796,0.197,0.5255,0.879,0.4625,0.4565,0.528,0.5835,0.884,0.096,0.1855,0.27,0.463,0.198,0.282,0.0995,0.092,0.0625,0.073,0.071,0.036,1.099,0.5905,0.768,0.413,0.8505,0.6915,0.709,0.3755,0.8185,0.227,0.8245,1.1825,1.122,1.6115,1.2985,1.3,1.161,1.489,1.008,0.441,0.742,0.7,0.271,0.8565,0.8975,0.6105,0.1925,0.6635,1.235,0.7615,0.592,0.39,0.7565,0.57,0.2865,0.2935,0.567,0.6245,0.8415,0.7775,0.989,0.6905,0.2,0.109,0.127,0.2885,0.18,0.144,0.4665,0.33,0.3625,0.34,0.365,0.5,0.6265,0.5555,0.6015,0.53,0.6315,0.7715,0.6125,0.872,0.8115,0.8795,0.983,1.145,1.09,1.262,1.185,1.4405,1.332,1.1405,1.201,1.33,1.362,1.647,1.4995,1.6225,1.786,1.791,1.925,1.689,1.659,2.0475,1.6015,2.0165,0.04,0.0565,0.064,0.0875,0.106,0.1315,0.126,0.155,0.149,0.185,0.2545,0.237,0.279,0.3205,0.3335,0.3885,0.545,0.4165,0.495,0.4775,0.468,0.4555,0.46,0.4155,0.4215,0.474,0.486,0.5735,0.468,0.5135,0.6215,0.494,0.6005,0.646,0.7945,0.812,0.828,0.681,0.889,0.7345,0.964,0.963,0.995,0.8585,0.948,0.888,0.9045,1.046,1.1775,1.0765,1.0255,0.9325,1.235,1.247,1.1495,1.1575,1.327,1.2,1.2705,1.2155,1.3245,1.3555,1.127,1.1075,1.4255,1.147,1.286,1.596,1.297,1.251,1.5105,1.4415,1.6385,1.933,1.71,1.8495,1.742,1.7975,2.381,2.398,2.1945,0.049,0.1055,0.1045,0.163,0.2275,0.219,0.3645,0.3265,0.3515,0.3465,0.407,0.4215,0.3755,0.5335,0.442,0.1315,0.5205,0.5535,0.5445,0.554,0.512,0.583,0.5765,0.723,0.5395,0.625,0.5925,0.633,0.832,0.778,0.7865,0.778,0.636,0.8435,0.648,0.784,0.908,1.02,0.811,0.897,0.852,0.938,0.6955,0.861,1.004,1.0115,1.1005,1.108,0.852,1.9875,1.079,1.055,1.198,1.084,1.103,1.1,1.1015,1.3835,1.115,1.085,1.3165,1.3415,1.027,1.1845,1.192,1.285,1.1805,1.2655,1.2895,1.407,1.122,1.4465,1.349,1.269,1.68,1.551,1.4775,1.529,1.7585,1.523,1.7315,1.51,1.88,2.012,2.201,0.0315,0.04,0.0635,0.0985,0.167,0.2015,0.183,0.187,0.1795,0.2065,0.3,0.2295,0.343,0.244,0.3075,0.3415,0.271,0.91,0.268,0.2885,0.3,0.326,0.358,0.314,0.4025,0.3645,0.4235,0.4305,0.3505,0.486,0.471,0.415,0.5195,0.5895,0.5215,0.4475,0.5585,0.596,0.5385,0.7665,0.516,0.7355,0.531,0.607,0.7055,0.6445,0.6315,0.7845,0.9475,0.712,0.89,0.912,0.656,0.936,0.6975,1.1465,0.825,0.72,0.8215,1.017,0.8975,1.2255,0.9865,0.844,0.8465,0.885,0.6735,0.8755,0.9235,0.977,1.0305,1.05,1.1145,0.877,1.285,1.3065,0.8725,1.0265,1.1605,1.0125,1.096,1.205,1.221,1.0005,1.1355,1.3135,1.1955,1.098,1.139,1.2265,1.042,1.368,1.446,1.4045,1.463,1.711,1.74,1.757,1.601,2.165,2.3305,0.0545,0.0725,0.0925,0.183,0.1525,0.187,0.232,0.196,0.2545,0.2625,0.362,0.4445,0.511,0.589,0.5945,0.529,0.872,0.77,0.8435,0.818,0.8035,0.8115,0.782,0.8745,0.984,0.95,1.1735,0.976,1.0785,1.057,1.11,1.142,1.1255,1.1045,1.3405,1.082,1.254,1.2005,1.243,1.286,1.1665,1.144,1.385,1.309,1.527,1.6385,1.691,1.719,1.52,1.613,2.2355,2.3235,0.1245,0.1285,0.181,0.1585,0.1965,0.198,0.1855,0.2145,0.3245,0.2625,0.371,0.298,0.336,0.447,0.4085,0.587,0.494,0.614,0.5075,0.5445,0.6115,0.5605,0.521,0.5775,0.5935,0.597,0.9505,0.616,0.8315,0.8725,0.8155,0.619,0.7595,0.742,0.804,0.664,0.745,0.728,0.777,0.8765,0.9895,0.9655,0.9065,1.049,0.9705,0.92,0.9525,0.7855,0.855,1.142,0.755,0.9745,1.2015,1.1295,0.9205,1.056,1.34,0.9625,1.0475,1.0915,1.167,0.9995,1.0485,1.2735,1.0625,1.1545,1.194,1.1215,0.9335,1.198,0.9545,1.3585,1.2075,1.217,1.217,0.92,0.8765,1.2615,1.2795,1.167,1.1885,1.3765,1.292,1.1795,1.29,1.2075,1.297,1.4585,1.151,1.197,1.539,1.676,1.6645,1.528,1.494,1.277,1.5965,1.3805,1.2565,1.527,1.4005,1.4405,1.482,1.2345,1.3435,1.533,1.8445,1.825,2.0885,2.087,1.884,0.305,0.4295,0.449,1.029,0.981,0.5745,0.693,1.183,0.7905,1.224,0.775,1.2705,1.406,0.873,0.9415,1.007,1.0835,0.9845,1.5245,1.024,1.281,1.148,1.136,1.2235,1.3695,1.006,1.307,1.463,1.2905,1.4265,1.7885,1.6135,2.2305,2.2635,0.074,0.2075,0.237,0.2665,0.215,0.253,0.309,0.3535,0.335,0.3875,0.365,0.4045,0.372,0.3965,0.5225,0.456,0.44,0.507,0.5285,0.572,0.6625,0.6445,0.6275,0.6885,0.6835,0.6855,0.6755,0.783,0.894,0.768,0.95,0.871,0.9785,0.7425,0.737,0.9175,0.8785,1.1275,0.9765,0.974,0.853,0.991,0.9125,0.921,0.869,0.8665,1.089,0.9615,1.145,0.907,1.1635,1.1955,1.31,1.251,1.145,1.154,1.1335,1.2015,1.5595,1.3165,1.403,1.204,1.2895,1.5175,1.3575,1.3645,1.494,1.664,1.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" \n",

"var gd = document.getElementById('7e6c2efd-afd5-4c68-9e1d-3e48196ba495');\n",

"var x = new MutationObserver(function (mutations, observer) {{\n",

" var display = window.getComputedStyle(gd).display;\n",

" if (!display || display === 'none') {{\n",

" console.log([gd, 'removed!']);\n",

" Plotly.purge(gd);\n",

" observer.disconnect();\n",

" }}\n",

"}});\n",

"\n",

"// Listen for the removal of the full notebook cells\n",

"var notebookContainer = gd.closest('#notebook-container');\n",

"if (notebookContainer) {{\n",

" x.observe(notebookContainer, {childList: true});\n",

"}}\n",

"\n",

"// Listen for the clearing of the current output cell\n",

"var outputEl = gd.closest('.output');\n",

"if (outputEl) {{\n",

" x.observe(outputEl, {childList: true});\n",

"}}\n",

"\n",

" }) }; </script> </div>\n",

"</body>\n",

"</html>"

]

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]

},

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"# 7. Check for Categorical columns and perform encoding.\n",

"\n",

"There is one Categorical column SEX is replaced by an Integer "

],

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}

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{

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"from sklearn.preprocessing import LabelEncoder\n",

"le = LabelEncoder()\n",

"data[\"Sex\"] = le.fit\_transform(data[\"Sex\"])\n",

"data[\"Sex\"]"

],

"metadata": {

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"id": "0W-L63FhCG35",

"outputId": "6e2170eb-a7ea-451a-fc88-0acf006339af"

},

"execution\_count": 16,

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{

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"data": {

"text/plain": [

"0 2\n",

"1 2\n",

"2 0\n",

"3 2\n",

"4 1\n",

" ..\n",

"4172 0\n",

"4173 2\n",

"4174 2\n",

"4175 0\n",

"4176 2\n",

"Name: Sex, Length: 4177, dtype: int64"

]

},

"metadata": {},

"execution\_count": 16

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]

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"#8. Split the data into dependent and independent variables."

],

"metadata": {

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}

},

{

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"x=data.iloc[:,0:8].values\n",

"y=data.iloc[:,8:9].values"

],

"metadata": {

"id": "mJFbiaMxMYxM"

},

"execution\_count": 26,

"outputs": []

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{

"cell\_type": "code",

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"x"

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"id": "oXBD5MBm0tQE",

"outputId": "a3f23709-3d6f-4341-9ec1-4a60e76a83c6"

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"execution\_count": 27,

"outputs": [

{

"output\_type": "execute\_result",

"data": {

"text/plain": [

"array([[2. , 0.455 , 0.365 , ..., 0.2245, 0.101 , 0.15 ],\n",

" [2. , 0.35 , 0.265 , ..., 0.0995, 0.0485, 0.07 ],\n",

" [0. , 0.53 , 0.42 , ..., 0.2565, 0.1415, 0.21 ],\n",

" ...,\n",

" [2. , 0.6 , 0.475 , ..., 0.5255, 0.2875, 0.308 ],\n",

" [0. , 0.625 , 0.485 , ..., 0.531 , 0.261 , 0.296 ],\n",

" [2. , 0.71 , 0.555 , ..., 0.9455, 0.3765, 0.495 ]])"

]

},

"metadata": {},

"execution\_count": 27

}

]

},

{

"cell\_type": "code",

"source": [

"y"

],

"metadata": {

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},

"execution\_count": 28,

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"text/plain": [

"array([[15],\n",

" [ 7],\n",

" [ 9],\n",

" ...,\n",

" [ 9],\n",

" [10],\n",

" [12]])"

]

},

"metadata": {},

"execution\_count": 28

}

]

},

{

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"# 9. Scale the independent variables"

],

"metadata": {

"id": "tJ48R5\_PMaAg"

}

},

{

"cell\_type": "code",

"source": [

"x=data.iloc[:,0:8]\n",

"print(x.head())"

],

"metadata": {

"colab": {

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},

"id": "BSKlkJqXDXWA",

"outputId": "3df15803-ce98-439a-dd9c-372e09e7b33e"

},

"execution\_count": 50,

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{

"output\_type": "stream",

"name": "stdout",

"text": [

" Sex Length Diameter Height Whole weight Shucked weight \\\n",

"0 2 0.455 0.365 0.095 0.5140 0.2245 \n",

"1 2 0.350 0.265 0.090 0.2255 0.0995 \n",

"2 0 0.530 0.420 0.135 0.6770 0.2565 \n",

"3 2 0.440 0.365 0.125 0.5160 0.2155 \n",

"4 1 0.330 0.255 0.080 0.2050 0.0895 \n",

"\n",

" Viscera weight Shell weight \n",

"0 0.1010 0.150 \n",

"1 0.0485 0.070 \n",

"2 0.1415 0.210 \n",

"3 0.1140 0.155 \n",

"4 0.0395 0.055 \n"

]

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]

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{

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"#10. Split the data into training and testing"

],

"metadata": {

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{

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"from sklearn.model\_selection import train\_test\_split\n",

"x\_train,x\_test,y\_train,y\_test = train\_test\_split(x,y,test\_size=0.3,random\_state=0)"

],

"metadata": {

"id": "MB7dWUmdEnsC"

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"execution\_count": 31,

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{

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"x\_train.shape"

],

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"id": "y1H9\_U7bNaZ\_",

"outputId": "b8789ce3-9ad0-44ec-8d8f-36a8d495354e"

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"text/plain": [

"(2923, 8)"

]

},

"metadata": {},

"execution\_count": 31

}

]

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{

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"x\_test.shape"

],

"metadata": {

"colab": {

"base\_uri": "https://localhost:8080/"

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"id": "qzgR3DWuNccT",

"outputId": "b5cd168a-d497-40f6-f5bb-be9480958c70"

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"data": {

"text/plain": [

"(836, 8)"

]

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"metadata": {},

"execution\_count": 27

}

]

},

{

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"#11. Build the Model"

],

"metadata": {

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}

},

{

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"source": [

"from sklearn.linear\_model import LinearRegression\n",

"lr = LinearRegression()"

],

"metadata": {

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},

"execution\_count": 36,

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{

"cell\_type": "markdown",

"source": [

"#12. Train the Model"

],

"metadata": {

"id": "CAgipcgtOS2y"

}

},

{

"cell\_type": "code",

"source": [

"lr.fit(x\_train, y\_train)"

],

"metadata": {

"colab": {

"base\_uri": "https://localhost:8080/"

},

"id": "5mXBw\_9aOXNu",

"outputId": "71914cb9-cba9-41d6-b251-c4fc315e5dec"

},

"execution\_count": 38,

"outputs": [

{

"output\_type": "execute\_result",

"data": {

"text/plain": [

"LinearRegression()"

]

},

"metadata": {},

"execution\_count": 38

}

]

},

{

"cell\_type": "markdown",

"source": [

"#13. Test the Model"

],

"metadata": {

"id": "1TUky-S2QGTW"

}

},

{

"cell\_type": "code",

"source": [

"y\_pred = lr.predict(x\_test)\n",

"print((y\_test)[0:6])\n",

"print((y\_pred)[0:6])"

],

"metadata": {

"colab": {

"base\_uri": "https://localhost:8080/"

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"#14. Measure the performance using Metrics."

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"# RMSE(Root Mean Square Error)\n",

"\n",

"from sklearn.metrics import mean\_squared\_error\n",

"mse = mean\_squared\_error(y\_test, y\_pred)\n",

"rmse = np.sqrt(mse)\n",

"print(\"RMSE value : {:.2f}\".format(rmse))"

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"RMSE value : 2.26\n"

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"from sklearn.model\_selection import cross\_val\_score\n",

"cv\_scores = cross\_val\_score(lr, x, y, cv=5)\n",

"sco=cv\_scores.round(4)\n",

"print(cv\_scores.round(4))\n",

"print(\"Average\",sco.sum()/5)"

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"[0.4113 0.1574 0.4807 0.5046 0.4362]\n",

"Average 0.39803999999999995\n"

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