**To find following the machine learning regression method using in r2 value**

**Customer Requirement is Profit Prediction.**

**1.MULTIPLE LINEAR REGRESSION**

**R²value=** 0.9358680892466282

**2. SUPPORT VECTOR MACHINE:**

**i. C\_Penalty:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S.NO** | **HYPER PARAMETER**  **(C\_VALUE)** | **LINEAR (R\_VALUE)** | **RBF (NON-LINEAR) (R\_VALUE)** | **POLY**  **(R\_VALUE)** | **SIGMOID**  **(R\_VALUE)** |
| **01.** | **0.01** | **0.933051202** | **-0.057491044** | **-0.057426535** | **-0.057492863** |
| **02.** | **0.1** | **0.940879882** | **-0.057475832** | **-0.056830963** | **-0.057494025** |
| **03.** | **1.0** | **0.877438218** | **-0.057323756** | **-0.050896585** | **-0.057505641** |
| **04.** | **10** | **0.538016145** | **-0.055807402** | **0.025319732** | **-0.057621827** |
| **05.** | **100** | **-107.977515970** | **-0.030227627** | **0.465666055** | **-0.058786436** |
| **06.** | **1000** |  | **0.160602990** | **0.640328111** | **-0.070707399** |
| **07.** | **10000** |  | **0.674318110** | **0.814189538** | **-0.217404365** |

**SVR(kernel=** **"linear",C=0.1) = 0.940879882**

**3.DECISION TREE:**

|  |  |  |  |
| --- | --- | --- | --- |
| **SL.NO** | **CRITERION** | **SPLITTER** | **R\_VALUE** |
| 01. | Squared error | Best | 0.9500940933132571 |
| 02. | Friedman\_mse | Best | 0.9430885976866211 |
| 03. | Absolute error | Best | 0.9674049674690902 |
| 04. | Poisson | Best | 0.9327038603462823 |
| 05. | Squared error | Random | 0.9569480691474833 |
| 06. | Friedman\_mse | Random | 0.8972703308150793 |
| 07. | Absolute error | Random | 0.958557055454426 |
| 08. | Poisson | Random | 0.934689136684058 |

**Decision Tree (criterion='squared\_error', splitter='best') =** 0.9674049674690902

**4.RANDOM FOREST:**

**i.Method-1**

|  |  |  |
| --- | --- | --- |
| **S.No** | **Estimators** | **R\_Value** |
| **01.** | **10** | 0.9028271728736914 |
| **02.** | **50** | 0.9411313710521312 |
| **03.** | **100** | 0.9450761490459694 |

**ii.Method-2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SL.NO** | **ESTIMATORS** | **CRITERION** | **MAX\_FEATURES** | **R\_VALUE** |
| 01. | 10 | Squared error | sqrt | 0.5271636655136465 |
| 02. | 50 | Squared error | sqrt | 0.6845189372926768 |
| 03. | 100 | Squared error | sqrt | 0.7592112879426982 |
| 04. | 10 | Squared error | log2 | 0.5271636655136465 |
| 05. | 50 | Squared error | log2 | 0.6845189372926768 |
| 06. | 100 | Squared error | log2 | 0.7592112879426982 |
| 07. | 10 | Absolute error | sqrt | 0.7210851275280454 |
| 08. | 50 | Absolute error | sqrt | 0.7221772080960871 |
| 09. | 100 | Absolute error | sqrt | 0.78692726459044 |
| 10. | 10 | Absolute error | log2 | 0.7210851275280454 |
| 11. | 50 | Absolute error | log2 | 0.7221772080960871 |
| 12. | 100 | Absolute error | log2 | 0.78692726459044 |
| 13. | 10 | Friedman\_mse | sqrt | 0.5271636655136465 |
| 14. | 50 | Friedman\_mse | sqrt | 0.6845189372926768 |
| 15. | 100 | Friedman\_mse | sqrt | 0.7592112879426982 |
| 16. | 10 | Friedman\_mse | log2 | 0.5271636655136465 |
| 17. | 50 | Friedman\_mse | log2 | 0.6845189372926768 |
| 18. | 100 | Friedman\_mse | log2 | 0.7592112879426982 |
| 19. | 10 | Poisson | sqrt | 0.7477003810086771 |
| 20. | 50 | Poisson | sqrt | 0.7477003810086771 |
| 21. | 100 | Poisson | sqrt | 0.7732129713050612 |
| 22. | 10 | Poisson | log2 | 0.7477003810086771 |
| 23. | 50 | Poisson | log2 | 0.724294796149562 |
| 24. | 100 | Poisson | log2 | 0.7732129713050612 |

**Random Forest maximum value:**

**Random Forest (Estimators = 100, criterion='squared\_error') =** 0.9450761490459694

**Finally, Decision Tree output is Okay in this Dataset:**

**Decision Tree (criterion='squared\_error', splitter='best') =** 0.9674049674690902