**Research on Best Model Via R Score Value**

**1.MLR**

**Inference** :

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| Best Model is created with r score Value = **0.9358680970046243** |

**2.SVMR**

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| **r score Value w/o**  **HTP= -**0.057418393916219834 | | |
| **kernel** | **C Value** | **r score** |
| ***linear*** | 1000 | 0.7802839882154124 |
| 2000 | 0.8767721687716041 |
| **3000** | **0.895674469433492** |
| ***poly*** | 1000 | 0.26616370931646915 |
| 2000 | 0.4810028155606567 |
| 3000 | 0.6370064223754037 |
| ***rbf*** | 1000 | 0.0067683444800727965 |
| 2000 | 0.06751554270553017 |
| 3000 | 0.12322756620227582 |
| ***sigmoid*** | 1000 | 0.18506861974160804 |
| 2000 | 0.39706528684272135 |
| 3000 | 0.5913630209426107 |

**Inference** :

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| Model is created with low r score value.  Considerable r score value = **0.895674469433492** is created for the H.T.P --- **kernel = linear, c= 3000.**  Though there is a chance of improving the model’s r score value by increasing C value beyond 3000, the predicted o/p value i.e profit shoots high to 8 figures which is quite not feasible. |

**3.Decision Tree**

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| **r score Value w/o HTP=** 0.8972291974969963 | | | | |
| **criterion** | **splitter** | **r score (w/o max features)** | **max\_**  **features** | **r score**  **( with max\_**  **features)** |
| ***squared\_error*** | best | 0.9214306220757318 | **sqrt** | 0.09798395941037275 |
| **log2** | 0.5061408543602336 |
| random | 0.6372581027214319 | **sqrt** | 0.41374230043571725 |
| **log2** | 0.6836504444368285 |
| ***absolute\_error*** | best | 0.9247519252928741 | **sqrt** | 0.9262950282088664 |
| **log2** | 0.7780902559935522 |
| random | 0.6268821377872036 | **sqrt** | 0.6013894721694882 |
| **log2** | 0.20527425924684006 |
| ***friedman\_mse*** | best | 0.8994752214576376 | **sqrt** | 0.6576345209785339 |
| **log2** | 0.6287085882321803 |
| random | 0.4088758524566112 | **sqrt** | 0.12467585310390261 |
| **log2** | 0.446231683510638 |
| ***poisson*** | **best** | **0.9457927379824442** | **sqrt** | 0.35884420644991866 |
| **log2** | 0.8015887460531157 |
| random | 0.8979430864116503 | **sqrt** | 0.4561485309437918 |
| **log2** | 0.9096872948752499 |

**Inference** :

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| Best model with high r score Value = **0.9457927379824442** is created for the HTP --- **criterion = poisson & splitter= best** without  max features |

**4.Random Forest**

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| **criterion** | **n estimators** | **r score (w/o max features)** | **max\_**  **features** | **r score**  **( with max\_**  **features)** |
| ***squared\_error*** | 50 | 0.9419810900432116 | **sqrt** | 0.6830022367685868 |
| **log2** |
| 100 | 0.9447360977699076 | **sqrt** | 0.7591504499484151 |
| **log2** |
| ***absolute\_error*** | 50 | 0.9401935247161504 | **sqrt** | 0.7222351871476136 |
| **log2** |
| 100 | 0.9459097460494243 | **sqrt** | 0.7870726821715768 |
| **log2** |
| ***friedman\_mse*** | 50 | 0.9396740716717181 | **sqrt** | 0.6902211615063268 |
| **log2** |
| 100 | 0.9430421895648843 | **sqrt** | 0.7580139406450639 |
| **log2** |
| ***poisson*** | **50** | **0.9461748447682533** | **sqrt** | 0.720862466757838 |
| **log2** |
| 100 | 0.9411213280886008 | **sqrt** | 0.7717642068103981 |
| **log2** |

**Inference** :

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| Best model with high r score Value = **0.9461748447682533** is created for the HTP--- **criterion = poisson & n estimators = 50**  without max features |

**Summary**

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| **Algorithm** | **HTP**  **(w/o max features)** | **Best r score** |
| MLR | - | 0.9358680970046243 |
| SVM | kernel = linear, c= 3000 | 0.895674469433492 |
| DT | criterion = poisson & splitter= best | 0.9457927379824442 |
| RF | criterion = poisson & n estimators = 50 | 0.9461748447682533 |

**Result Analysis:**

For the given dataset **RF algorithm for HTP criterion = poisson & n estimators = 50**

suits the best.

**Appendix:**

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| **Abbreviations** | **Expansion** |
| MLR | Multiple Linear Regression |
| SVM | Support Vector Machine |
| DT | Decision Tree |
| RF | Random Forest |
| HTP | Hyper Tuning Parameters |