**Machine Learning - Regression**

**Sample Data : Insurance\_Premium :**

1. **Multiple Linear Regression** - R2 Value = 0.7894
2. **Support Vector Machine**:

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| **S.No** | **Regularization Parameter ‘C’** | R2 Value **for different Kernel** | | | |
| **Linear** | **Poly** | **rbf** | **sigmoid** |
| 1 | 1 | -0.010 | -0.075 | -0.083 | -0.075 |
| 2 | 10 | 0.462 | 0.038 | -0.0320 | 0.039 |
| 3 | 100 | 0.628 | 0.617 | 0.320 | 0.527 |
| 4 | 1000 | 0.764 | 0.856 | 0.810 | 0.287 |
| 5 | 3000 | 0.741 | 0.859 | 0.866 | -2.724 |

For the given dataset, c=3000; Kernel = “rbf” fits data better; r2 = 0.866

1. Decision Tree:

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| --- | --- | --- | --- |
| **S.No** | **Criteria** | **Splitter** | **R\_Value** |
| 1 | ***squared\_error*** | best | 0.692 |
| 2 | ***squared\_error*** | random | 0.712 |
| 3 | ***friedman\_mse*** | best | 0.691 |
| 4 | ***friedman\_mse*** | random | 0.718 |
| 5 | ***absolute\_error*** | best | 0.663 |
| 6 | ***absolute\_error*** | random | 0.739 |
| 8 | ***poisson*** | best | 0.662 |
| 9 | ***poisson*** | random | 0.728 |

For the given dataset, criteria = ***absolute\_error***; splitter = random fits data better; r2=0.739

1. Random Forest

|  |  |  |  |
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| **S.No** | **Criteria** | **n\_esimators** | **R\_Value** |
| 1 | ***squared\_error*** | 10 | 0.843 |
| 2 | ***squared\_error*** | 100 | 0.855 |
| 3 | ***friedman\_mse*** | 10 | 0.837 |
| 4 | ***friedman\_mse*** | 100 | 0.855 |
| 5 | ***absolute\_error*** | 10 | 0.840 |
| 6 | ***absolute\_error*** | 100 | 0.854 |
| 8 | ***poisson*** | 10 | 0.823 |
| 9 | ***poisson*** | 100 | 0.852 |

For the given dataset, criteria = ***Friedman\_mse***; n\_estimators = 100 data better; r2=0.855