**Computational Complexity of ML Algorithms**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name of the Algorithm** | **Time** | | **Space** | |
| **Train** | **Test** | **Train** | **Test** |
| Logistic Regression | O(n x d) | O(d) | O(n x d) | O(d) |
| SVC | O(*n^2* x d) to O(n^3 x d) | O(s x d) | O(n x d) | O(s x d) |
| Random Forest | O(k x n^2 x d) | O(k x d) | O(#nodes x k) | O(#nodes x k) |
| Gradient Boosting | O(k x n x d) | O(k x d) | O(k x d + ɣ x m) | O(k x d + ɣ x m) |
| XGBoost | O(K x depth x M x log n) | O(K x depth x M x log n) | O(n \* 2 ^ depth) | O(n \* 2 ^ depth) |

where n = number of data points,

d = number of dimensions,

s = number of support vectors,

k = number of decision trees,

#nodes = number of nodes,

ɣ x m = output values for each leaf in decision trees,

depth = depth of the tree