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Assignment (Bias and Variance)

1. **What are various types of errors seen in a machine learning model?**
   There is Reducible errors(Bias and Variance), Irreducible errors can be seen in ML model.

2. **What do you mean by Bias and Variance?**
   Bias is error associated with training data on the other hand Variance is an error associated with testing data.

3. **How do we deal with Variance and Bias?**
   One of the practices to reduce Bias can be to change the methodologies being used to create models. So for Models having High bias, the correct method will be not to use a Linear model if features and target variables of data do not in fact have a Linear Relationship.

4. **What do you mean by Bias-Variance Trade-off?**
   The bias–variance tradeoff is the property of a model that the variance of the parameter estimated across samples can be reduced by increasing the bias in the estimated parameters. Trade-off is tension between the error introduced by the bias and the variance.

5. **What is a underfit or an overfit model?**
   Underfitting means that your model makes accurate predictions, but initially incorrect predictions. In this case, train error is large and val/test error is large too. Overfitting means that your model makes accurate predictions for only training data, but not accurate predictions for validation/test data.

6. **What is the optimal condition for Bias and Variance?**
   Maintaining Low bias and low variance balance is the task have to do in bias variance trade off for best model. For best model not having overfit or underfit, it is should be maintained at optimal level. (training and testing accuracy should be low and approximately same).

7. **Is it acceptable to have a model with high bias?**
   No, it is not acceptable because accuracy of model having high bias is low. A model with a higher bias would not match the data set closely.

8. **Give some examples of machine learning model having high variance.**
   In ML model if a model trained, it predicting with low accuracy on testing data. So it is a model having high variance. Examples of high-variance machine learning algorithms include: Decision Trees, k-Nearest Neighbors and Support Vector Machines.

9. **Give some examples of machine learning model having low variance.**
   If the ML model predicting accurately on unseen data then it have low variance. Examples of low-variance machine learning algorithms include: Linear Regression and Logistic Regression.

10. **Give two best examples of configuring bias variance trade-off in specific models.**
    Bias is the simplifying assumptions made by the model to make the target function easier to approximate. Variance is the amount that the estimate of the target function will change given different training data. Trade-off is tension between the error introduced by the bias and the variance.