Overfitting and underfitting are concepts that describe how well a statistical model or machine learning algorithm captures the underlying patterns of the data set. When considering these concepts in relation to a normal distribution, they can be understood as follows:

**Overfitting**

* **Description**: Overfitting occurs when a model learns both the underlying pattern and the noise in the training data to such an extent that it performs poorly on new, unseen data. In the context of a normal distribution, overfitting might mean that the model is too sensitive to small fluctuations or outliers in the training data, resulting in a model that fits the training data exceptionally well but generalizes poorly to other data drawn from the same distribution.
* **Characteristics**:
  + High accuracy on training data but poor accuracy on test data.
  + The model may capture noise or outliers as if they were significant features of the distribution.
  + Overly complex models with too many parameters are often prone to overfitting.

**Underfitting**

* **Description**: Underfitting occurs when a model is too simple to capture the underlying structure of the data. In the context of a normal distribution, underfitting might happen if the model cannot capture the central tendency and variability of the data adequately, perhaps by not accounting for the spread or the shape of the distribution accurately.
* **Characteristics**:
  + Poor performance on both training and test data.
  + The model is too simplistic and does not capture the basic trends of the data.
  + Often results from a model being too general or having too few parameters to capture the complexity of the data.

**Key Differences in the Context of Normal Distribution**

* **Fit to Data**: Overfitting models are too closely tied to the specific details and noise of the training data, possibly capturing peculiarities that do not generalize. Underfitting models, on the other hand, fail to capture even the basic characteristics of the normal distribution, such as its mean or standard deviation.
* **Model Complexity**: Overfitting is associated with overly complex models that have too many parameters relative to the amount of data. Underfitting is associated with overly simplistic models that lack the necessary parameters to capture the distribution's characteristics.
* **Performance**: Overfit models have excellent performance on the training data but poor performance on unseen data. Underfit models perform poorly across both training and test datasets because they fail to model the normal distribution effectively.

To mitigate overfitting and underfitting, especially in the context of modeling data that follows or is assumed to follow a normal distribution, techniques such as cross-validation, regularization, and choosing the right model complexity are essential. These strategies help in achieving a good balance between bias and variance, enabling the model to capture the underlying distribution accurately without being swayed by noise or overly simplistic assumptions.