short guidance note explaining feature selection techniques in machine learning to a hypothetical student struggling with the concept.

Feature selection is a process of choosing a subset of features from the original features that are most relevant and useful for building a machine learning model. Feature selection can help you to reduce the dimensionality of your data, speed up your learning algorithm, improve the accuracy and interpretability of your model, and avoid overfitting.

*Let us take an example of student data.*

*Now we have to find the accuracy of their marks in the student data we have the attributes*

1. *Name*
2. *Date of Birth*
3. *Nationality*
4. *Class*
5. *Exam scores*
6. *Total credits*
7. *CGPA*

*Now to measure the exam performance we can’t choose the name, DOB, Nationality, Class which doesn’t give the performance of their studies based on the performance measures we have to choose the attributes or features. If we choose the features other than them it effects the model’s computation and increases the complexity of performance and takes lots of time to compute hence efficiency decreases.*

There are various approaches to performing feature selection techniques in machine learning, each with its strengths and limitations. Here, we will explore three common categories of feature selection techniques: filter methods, wrapper methods, and embedded methods.

**Filter Methods**

Filter methods evaluate the relevance of features independently of the machine learning algorithm chosen. These techniques utilize statistical measures to rank and choose features. Two commonly used filter methods include Variance Threshold and Chi-Square Test.

**Wrapper Methods**

Wrapper methods evaluate feature subsets by iterative training and evaluating a specific machine learning algorithm. These methods directly measure the impact of features on the model's performance. Recursive Feature Elimination and Forward Selection are popular wrapper methods.

**Embedded Methods**

Embedded methods incorporate feature selection as part of the model training process. These techniques automatically select relevant features during model training. Lasso Regression and Random Forest Importance have been widely used embedded methods.