Accuracy vs recall

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In machine learning, both accuracy and recall are important metrics used to evaluate the pe
models, but they serve different purposes and are chosen based on the specific requiremen

Accuracy

Accuracy is a straightforward metric that measures the proportion of correctly classified inst
and true negatives) out of the total number of instances evaluated. It is calculated as:
Accuracy=TP+TNTP+TN+FP+FN\text{Accuracy} = \frac{TP + TN}{TP + TN + FP + FN}Accuracy=

When to Use Accuracy:

- Accuracy is typically used when the classes in the dataset are balanced, meaning there number of instances for each class.
- It provides a general idea of how well the model is performing overall in terms of corr

Example Scenario:

- In a scenario where correctly predicting all classes equally matters, such as sentiment and negative sentiments are equally important.

Recall

Recall (also known as sensitivity or true positive rate) measures the proportion of actual pos
identified by the model. It focuses specifically on the model's ability to correctly detect posit
out of all actual positive instances (true positives + false negatives). It is calculated as:
Recall=TPTP+FN\text{Recall} = \frac{TP}{TP + FN}Recall=TP+FNTP

When to Use Recall:

- Recall is particularly useful when the cost of false negatives (missed positive instances correctly identifying all positive cases (even at the expense of more false positives) is c
- It is important in applications where the goal is to minimize the number of false negat diagnostics or fraud detection.

Example Scenario:

- In medical diagnostics, where the priority is to correctly identify all patients with a dis negatives), even if it means some healthy patients might be incorrectly identified as h positives).

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Choosing Between Accuracy and Recall

- **Balanced Classes**: If the classes are balanced (roughly equal number of instances for e provide a good overall measure of performance.
- **Imbalanced Classes**: When dealing with imbalanced classes (where one class significar accuracy can be misleading. In such cases, recall (or other metrics like precision-recall more informative, especially for the minority class.
- **Cost Considerations**: The choice between accuracy and recall also depends on the spe false positives and false negatives in the application domain. If missing positive instanc costly than incorrectly labeling negative instances (false positives), recall becomes mo

In summary, while accuracy gives a general measure of correct predictions across all classes, on the ability to detect positive instances correctly. The choice between these metrics deper and the specific requirements and costs associated with the problem being solved.

why does imbalanced classes mean it is better to use recall score

Imbalanced classes in a classification problem refer to a situation where one class (typically significantly less frequent than another (the majority class). For example, in fraud detection, transactions is much lower than the number of legitimate transactions. In medical diagnosti with a rare disease might be much smaller compared to those without the disease.

Challenges with Imbalanced Classes

When faced with imbalanced classes, accuracy as a metric can be misleading and not reflect performance. This is because:

1. **Skewed Performance Evaluation**: Accuracy can be high even if the model predicts the most of the time, while performing poorly on the minority class. For instance, if 90% o majority class, a model that simply predicts everything as the majority class can achiev
2. **Focus on Minority Class**: In many real-world applications, correctly identifying instanc (positive instances, such as fraudulent transactions or patients with a rare disease) is r identifying the majority class. The cost of missing a positive instance (false negatives) c compared to incorrectly classifying a negative instance (false positives).

Why Recall Score is Preferable

Recall (or sensitivity) focuses directly on the model's ability to correctly identify positive inst all actual positive instances (true positives + false negatives). In imbalanced classes scenario beneficial because:

- **Prioritizes Minority Class**: It explicitly measures how well the model identifies instanc recall indicates that the model is effective in capturing most of the positive instances, goal in applications where the minority class is of greater interest.
- **Handles Class Imbalance**: Unlike accuracy, which can be misleading due to class imbal

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- **Handles Class Imbalance**: Unlike accuracy, which can be misleading due to class imba picture of the model's performance on the positive class, which is typically the class of scenarios.
- **Decision Support**: In applications such as fraud detection or medical diagnostics, high proportion of actual positive cases are correctly identified, providing more reliable dec

Conclusion

In summary, imbalanced classes often necessitate the use of recall (or sensitivity) as a metri addresses the challenges posed by the rarity of the minority class. By focusing on the model instances, recall provides a more meaningful evaluation of performance in scenarios where instances is high. Therefore, in imbalanced classification problems, prioritizing recall score o assessing the model's effectiveness in correctly identifying instances of the minority class, w world applications.

f interest in imbalanced

recall ensures that a large
cision support.

c because it specifically
's ability to detect positive
the cost of missing positive
ver accuracy helps in
hich is crucial for many real-