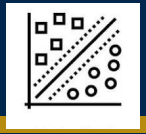
Support Vector Machine (SVM)



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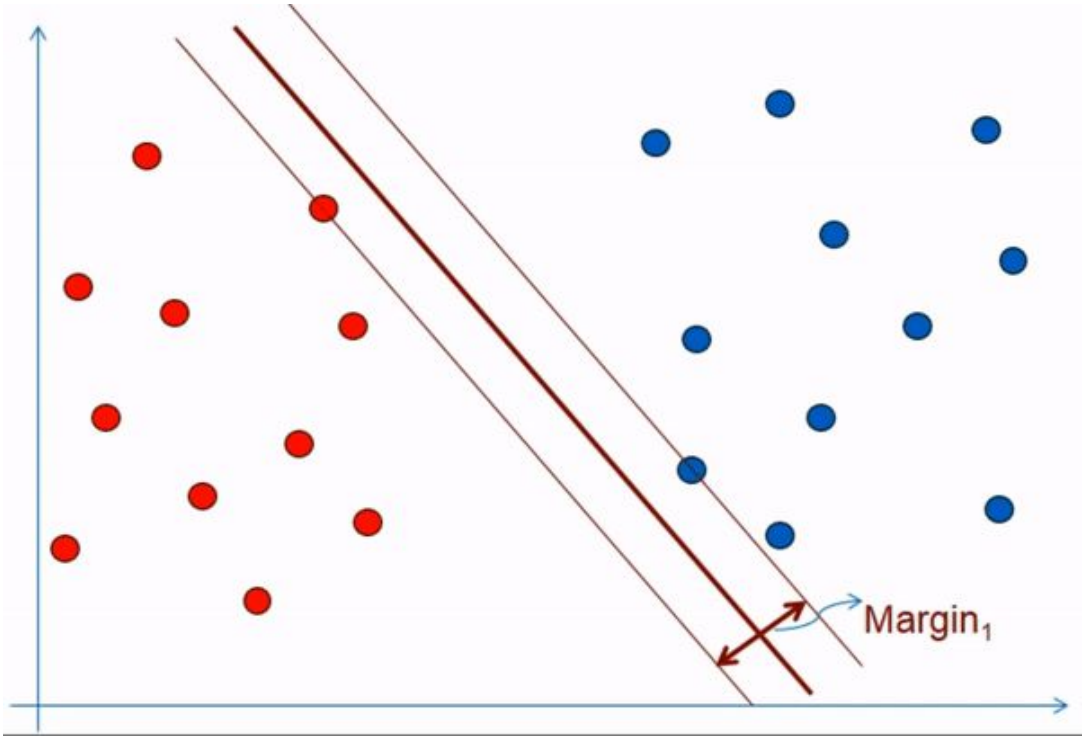
Supporting Vectors



SVM

A Support Vector Machine (SVM) is a powerful algorithm used for classification and regression tasks. This dataset can help explore relationships between factors like age, gender, engine size, and accident history to predict fraudulent claims. For instance, you might find that younger males with larger engines and no recent claims are more likely to commit fraud.

```
from sklearn.svm import SVC
svc = SVC()
svc.fit(X_train,y_train)
svc.score(X_train,y_train)*100
```

```
61.42857142857143
```

SVM: Previsões

preds = svc.predict(X_test) uses a trained Support Vector Classifier (svc) to predict the class labels for the test data (X_test). The predictions are stored in the variable preds.

```
preds = svc.predict(X_test)
preds
```

```
array([1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 1, 1, 0, 0, 0, 0, 1, 1, 1, 1, 0, 1,
       0, 1, 1, 1, 1, 1, 0, 1])
```

Accuracy

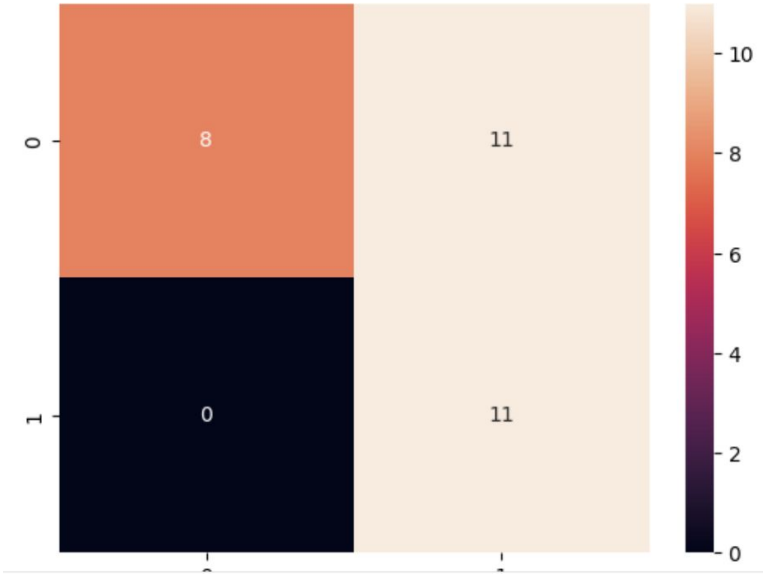
```
from sklearn.metrics import accuracy_score
test_accuracy = accuracy_score(y_test,preds)*100
test_accuracy
```

```
63.33333333333333
```

Matriz de Confusão

```
from sklearn.metrics import confusion_matrix
import seaborn as sns
cm = confusion_matrix(y_test,preds)
print(cm)
sns.heatmap(cm, annot=True, fmt="d")
```

```
[[ 8 11]
 [ 0 11]]
<Axes: >
```



		Predicted	
		0	**1**
Actual	**0**	TN	FP
	1	FN	TP

Classification Report: Precision e Recall

```
from sklearn.metrics import classification_report
print(classification_report(y_test,preds))
```

```
              precision    recall  f1-score   support

           0       1.00      0.42      0.59        19
           1       0.50      1.00      0.67        11

    accuracy                           0.63        30
   macro avg       0.75      0.71      0.63        30
weighted avg       0.82      0.63      0.62        30
```

$$Precision = \frac{TP}{TP + FP} \qquad Recall = \frac{TP}{TP + FN}$$

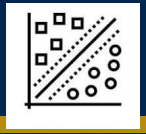
Exercício: SVM - RiscoCredito

RiscoCredito - okk.csv e RiscoCredito - prever2.csv

- Analise o Histórico de Crédito e verifique quais são as probabilidades de um cliente ter seu crédito aprovado ou não, utilizando o algoritmo de **SVM** (classificador).
  - Avalie o crédito para um novo conjunto de potenciais clientes.

treino: https://raw.githubusercontent.com/lcbjrrr/data/main/RiscoCredito%20-%20okk.csv
test: https://raw.githubusercontent.com/lcbjrrr/data/main/RiscoCredito%20-%20prever2.csv

Support Vector Machine (SVM)



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ATIVIDADE: SVM

- Escolha uma base de dados no https://www.kaggle.com/datasets, e se familiarize com sua base
- Procure realizar a previsão (inferência) de uma variável categórica através de um SVM. Se certifique de medir seus níveis de assertividade. Esteja a vontade a realizar mais um hiperparâmetro (número de vizinhos) de um e compará-los
- Não esqueça de junto com seus códigos realizar suas análises/conclusões (use o botão de +Texto).