Manobras no Rocket League

Classificador de Bayes para classificar manobras

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Banco de dados

Rocket League Skillshots

Donated on 8/14/2023

This dataset contains data of players of the game Rocket League, performing different skillshots.

Dataset Characteristics	Subject Area	Associated Tasks
Tabular, Time-Series	Games	Classification

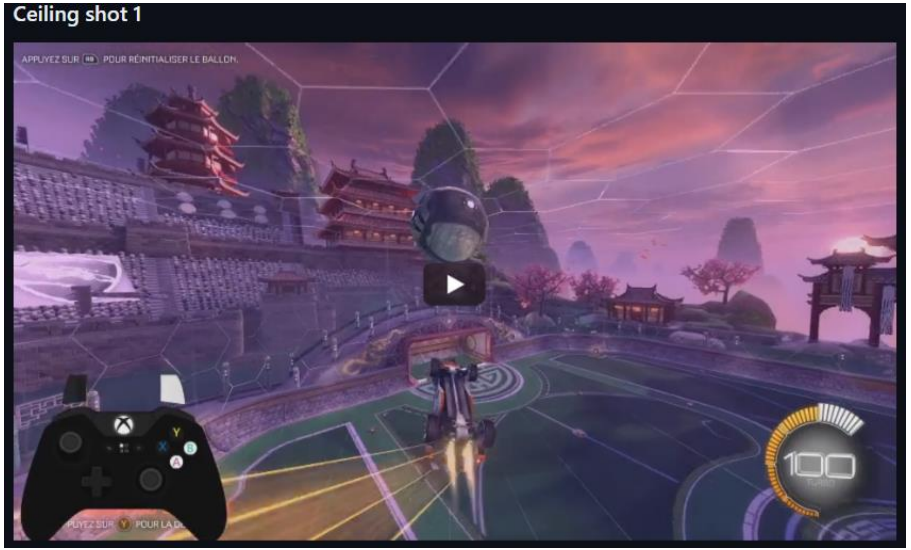
Feature Type	# Instances	# Features
Real	297	-

https://github.com/Romathonat/RocketLeagueSkillsDetection

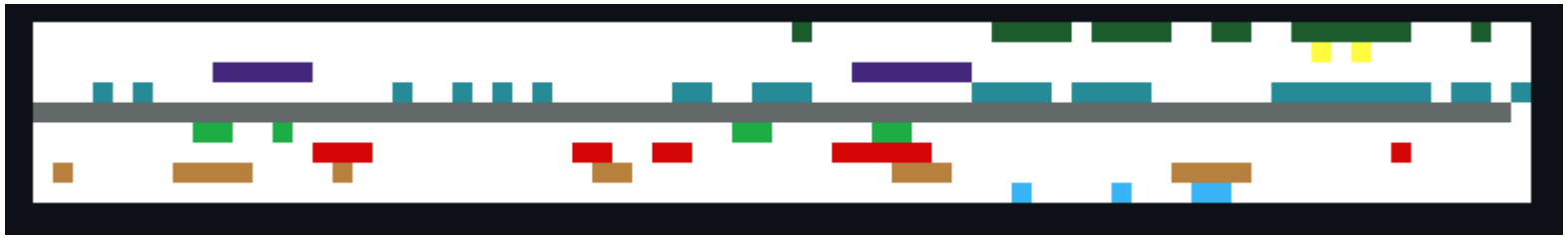
Compreendendo os dados

- 1. BallAcceleration;
- 2. Time;
- 3. DistanceWall;
- 4. DistanceCeil;
- 5. DistanceBall;
- 6. PlayerSpeed;
- 7. BallSpeed;
- 8. up;
- 9. accelerate;
- 10. slow;
- 11. goal;
- 12. left;
- 13. boost;
- 14. camera;
- 15. down;
- 16. right;
- 17. slide;
- 18. jump;

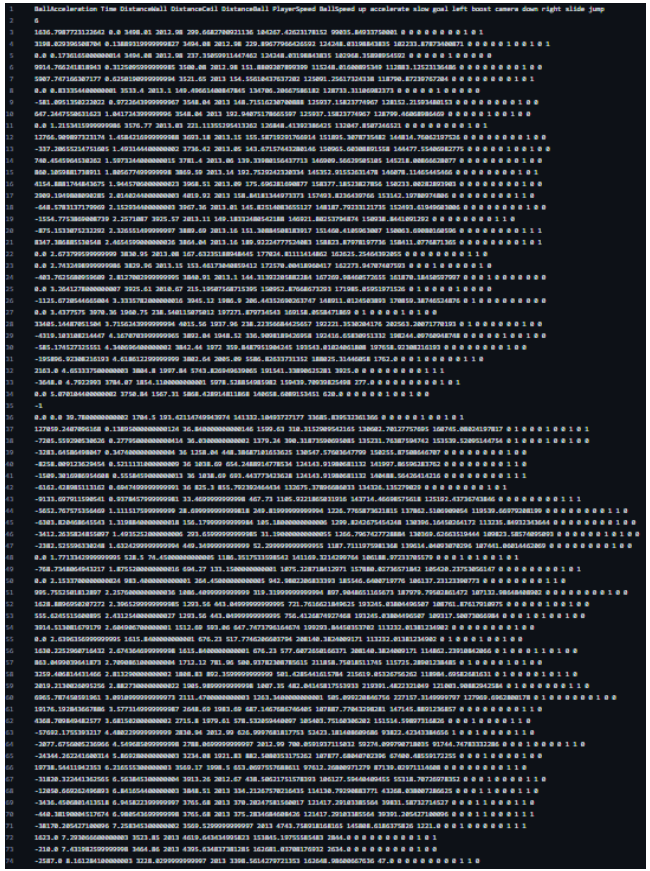
Tratamento dos dados



- Down
- Camera
- Up
- Right
- Accelerate
- Jump
- Boost
- Left
- Slide



Tratamento dos dados



- 1. BallAcceleration - Útil;
- 2. Time - Útil;
- 3. DistanceWall - Útil;
- 4. DistanceCeil - Útil;
- 5. DistanceBall - Útil;
- 6. PlayerSpeed - Útil;
- 7. BallSpeed - Útil;
- 8. up - Útil;
- 9. accelerate - Útil;
- 10. slow - Inútil;
- 11. goal - Inútil;
- 12. left - Inútil;
- 13. boost - Útil;
- 14. camera - Inútil;
- 15. down - Útil;
- 16. right - Inútil;
- 17. slide - Inútil;
- 18. jump - Útil;

Análise exploratória dos dados

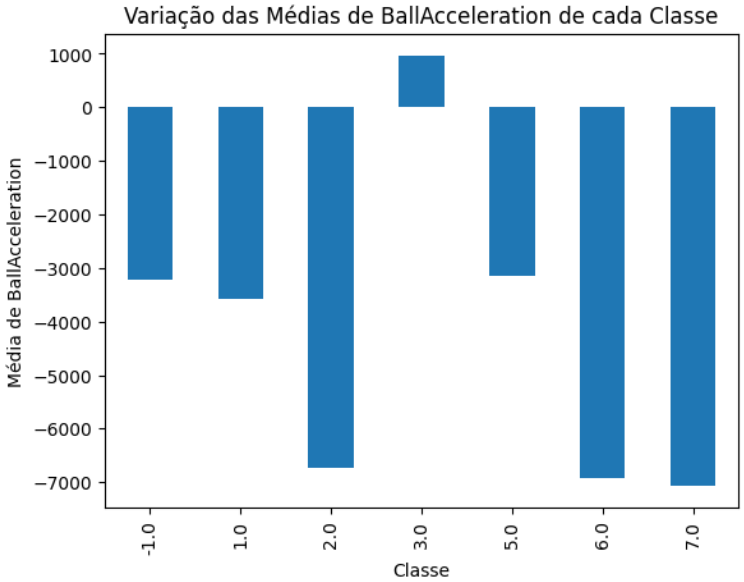
```
for i in range(len(dataset)):
    if pd.isna(dataset.iloc[i,1]) or i == len(dataset) - 1:
        if qtdLinhas > 0:
            matrizFinal.append([dataset.iloc[i-qtdLinhas:i,0].mean(), timeFinal, dataset.iloc[i-qtdLinhas:i,2].var(),
                                dataset.iloc[i-qtdLinhas:i,3].var(),
                                dataset.iloc[i-qtdLinhas:i,4].var(), dataset.iloc[i-qtdLinhas:i,5].mean(),
                                dataset.iloc[i-qtdLinhas:i,6].mean(), dataset.iloc[i-qtdLinhas:i,7].sum(),
                                dataset.iloc[i-qtdLinhas:i,8].sum(),
                                dataset.iloc[i-qtdLinhas:i,9].sum(), dataset.iloc[i-qtdLinhas:i,10].sum(),
                                classe])
        classe = dataset.iloc[i,0]
        qtdLinhas = 0
        timeFinal = 0
    else:
        qtdLinhas += 1
        timeFinal = dataset.iloc[i,1]

finalFeatures = features + ["classe"]
processedData = pd.DataFrame(matrizFinal,columns=finalFeatures)
processedData.head()
```

Análise exploratória dos dados

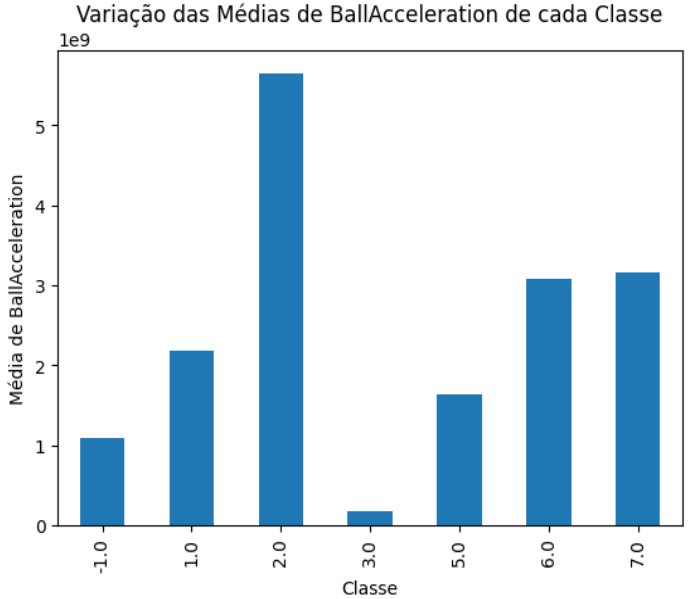
	BallAcceleration	Time	DistanceWall	DistanceCeil	DistanceBall	PlayerSpeed	BallSpeed	up	boost	down	jump	classe
0	-3853.867885	5.070104	3.059738e+04	6917.679671	3.546207e+06	152961.454638	129791.809510	0.0	7.0	0.0	9.0	6.0
1	-848.813985	8.161284	1.981624e+06	561237.455429	1.326933e+06	147893.764224	96963.150194	1.0	8.0	0.0	10.0	-1.0
2	-1264.766385	8.130110	2.308898e+06	564614.846333	1.084948e+06	147510.308898	96556.211527	0.0	10.0	0.0	7.0	-1.0
3	-2133.341430	3.610510	9.436052e+05	176821.531636	1.358482e+05	171583.561188	121592.704957	0.0	7.0	0.0	11.0	-1.0
4	-7148.505767	3.681763	1.537356e+04	857.226355	1.308056e+06	163413.423195	149543.364532	1.0	8.0	0.0	5.0	-1.0

	BallAcceleration	Time	DistanceWall	DistanceCeil	DistanceBall	PlayerSpeed	BallSpeed	up	boost	down	jump	classe
count	298.000000	298.000000	2.980000e+02	2.980000e+02	2.980000e+02	298.000000	298.000000	298.000000	298.000000	298.000000	298.000000	298.000000
mean	-4452.819314	4.074706	2.543351e+07	1.044325e+05	2.009341e+06	154533.729820	123599.619123	0.929530	6.077181	0.238255	9.436242	3.268456
std	4767.413370	1.704921	3.068464e+08	2.082541e+05	1.705919e+06	30163.620006	42925.508545	1.722812	4.194443	1.038135	6.683133	2.605694
min	-26128.652035	1.009000	0.000000e+00	5.686867e-26	3.321846e-02	400.374959	0.000000	0.000000	0.000000	0.000000	0.000000	-1.000000
25%	-6807.479333	2.785029	3.238837e+04	1.177797e+03	7.241118e+05	140020.088387	108000.574347	0.000000	3.000000	0.000000	4.000000	2.000000
50%	-4064.452173	3.940157	1.060573e+05	3.328337e+03	1.542971e+06	155827.752649	129459.608099	0.000000	6.000000	0.000000	9.000000	3.000000
75%	-1295.464847	5.015213	1.340235e+06	1.520008e+05	3.026675e+06	172907.893940	147342.590456	1.000000	9.000000	0.000000	13.000000	6.000000
max	11599.404268	13.470363	4.805408e+09	2.203612e+06	7.306665e+06	228114.832665	210877.285380	8.000000	20.000000	9.000000	37.000000	7.000000

Análise explanatória dos dados



Média das médias



Média das Variâncias

Análise exploratória dos dados

- 1. BallAcceleration - Média;
- 2. Time – Valor Final;
- 3. DistanceWall - Variância;
- 4. DistanceCeil - Variância;
- 5. DistanceBall - Variância;
- 6. PlayerSpeed - Média;
- 7. BallSpeed - Média;
- 8. up - Somatório;
- 9. boost - Somatório;
- 10. down - Somatório;
- 11. jump - Somatório;

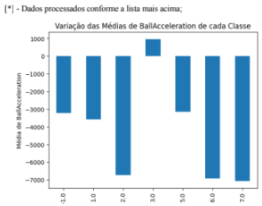


Fig. 2 – [*] Nota-se uma tendência diversa para cada valor;

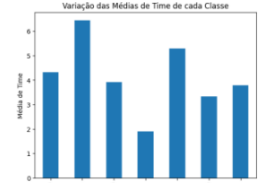


Fig. 3 - [*] Comportamento diverso entre os tempos de duração;

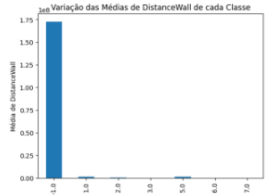


Fig. 4 - [*] Comportamento da manobra –1, que é a manobra que falhou, é notavelmente diferente dos outros com esse dado, o que pode ajudar a separar uma falha de uma manobra de verdade;

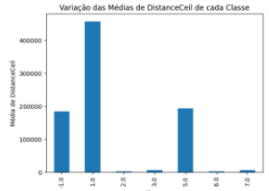


Fig. 5 -[*] Manobras aéreas se destacam tanto quanto erros;

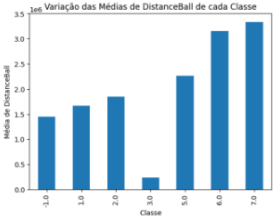


Fig. 6 - [*] Comportamento distinto para cada classe;

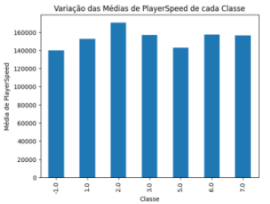


Fig. 7 - [*] Ainda que os valores sejam bem próximos, nota-se que as manobras que usam o boost possuem uma velocidade maior;

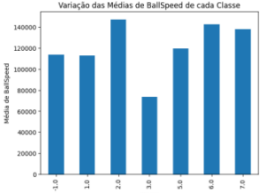


Fig. 8 - [*] Nota-se as manobras com menos contato com a bola;

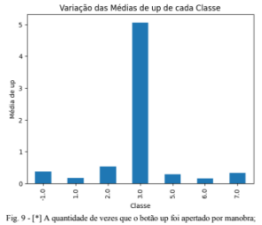


Fig. 9 - [*] A quantidade de vezes que o botão up foi apertado por manobra;

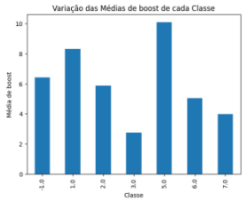


Fig. 10 - [*] A necessidade média dos boost por manobra é bem diversa;

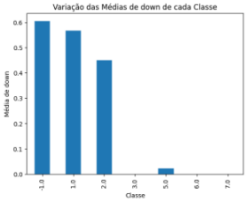


Fig. 11 - [*] O quão pouco o botão down é usado em manobras;

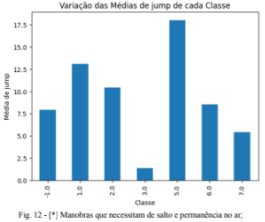
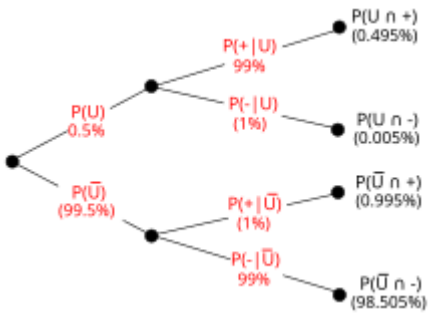
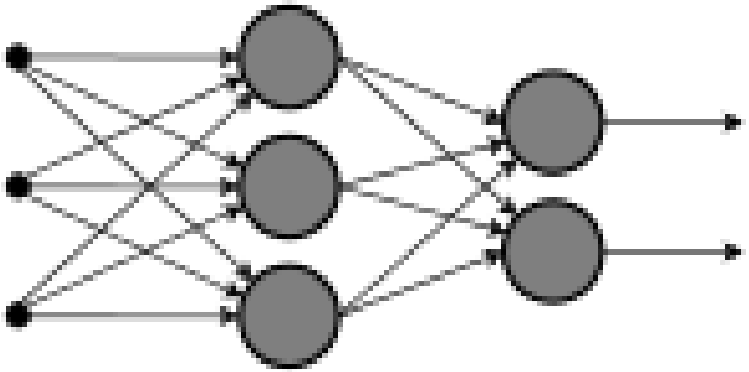


Fig. 12 - [*] Manobras que necessitam de salto e permanência no ar;

Classificador ingênuo de Bayes

$$P(A/B) = \frac{P(B/A)xP(A)}{P(B)}$$

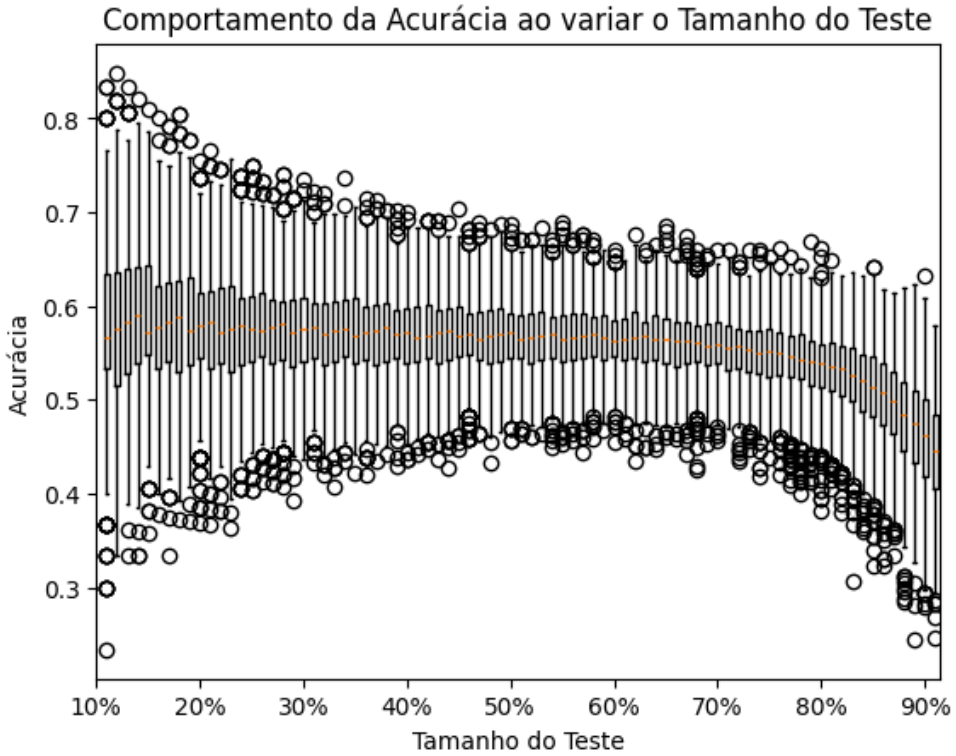




Resultados

```
Y = processedData.classe
X = processedData.drop(['classe'], axis=1)

for test_size in test_sizes:
  acc_list = []
  for i in range(1000):
    X_train, X_test, Y_train, Y_test = train_test_split(X, Y, test_size=test_size)
    model = GaussianNB()
    model.fit(X_train, Y_train)
    Y_pred = model.predict(X_test)
    acc_list.append(accuracy_score(Y_test,Y_pred))
  results.append(acc_list)
```

Resultados


Comportamento da Acurácia ao variar o Tamanho do Teste
Acurácia
0.8
0.7
0.6
0.5
0.4
0.3
10%
20%
30%
40%
50%
60%
70%
80%
90%
Tamanho do Teste

Conclusão

- Eficiência do Bayes Ingênuo
- Relevância
- Comparação