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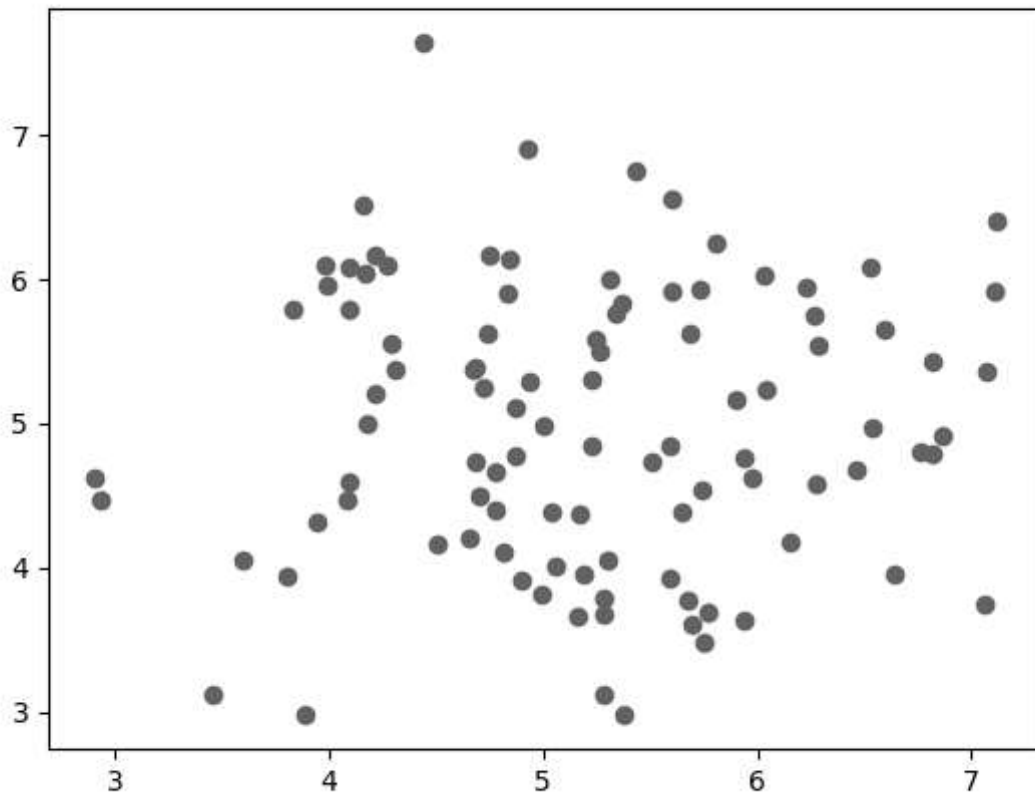
Aprendizado de máquina - gráfico de dispersão

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Gráfico de dispersão

Um gráfico de dispersão é um diagrama onde cada valor no conjunto de dados é representado por um ponto.



O módulo Matplotlib possui um método para desenhar gráficos de dispersão, ele precisa de dois arrays de mesmo comprimento, um para os valores do eixo x e outro para os valores do eixo y:

```
x = [5,7,8,7,2,17,2,9,4,11,12,9,6]
```

```
y = [99,86,87,88,111,86,103,87,94,78,77,85,86]
```

A `x` matriz representa a idade de cada carro.

A `y` matriz representa a velocidade de cada carro.

Exemplo

Use o `scatter()` método para desenhar um diagrama de dispersão:

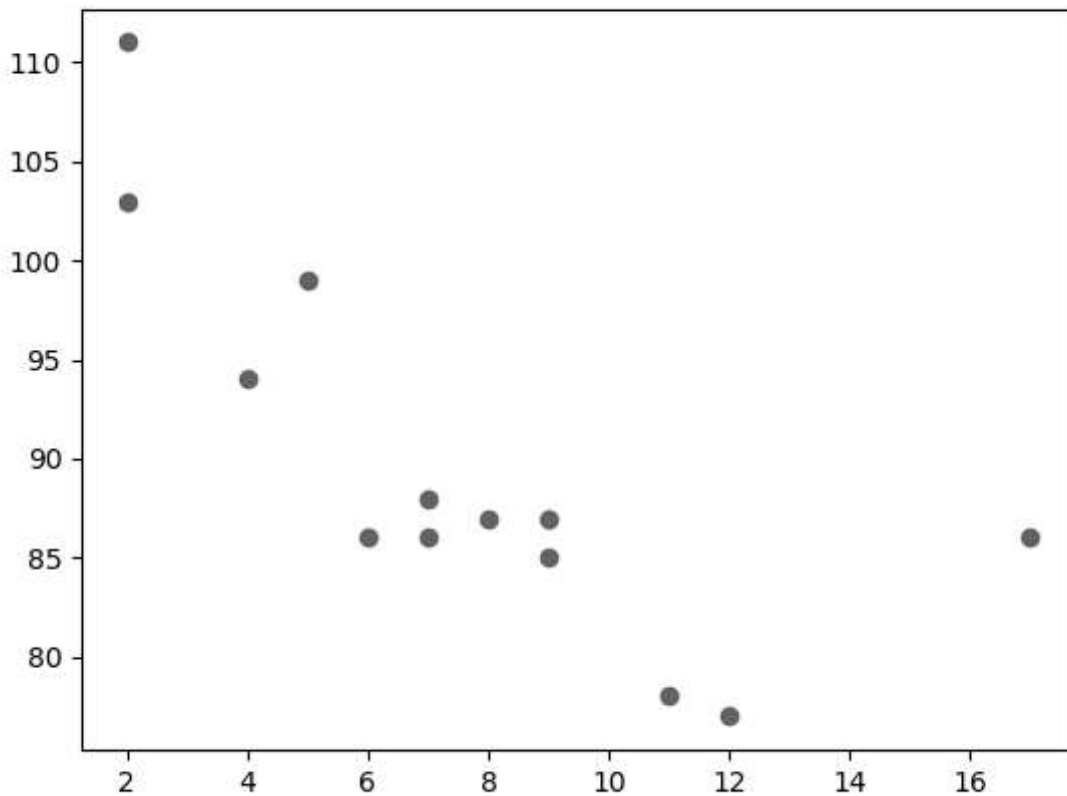
```
import matplotlib.pyplot as plt
```

```
x = [5,7,8,7,2,17,2,9,4,11,12,9,6]
```

```
y = [99,86,87,88,111,86,103,87,94,78,77,85,86]
```

```
plt.scatter(x, y)  
plt.show()
```

Resultado:



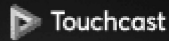
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Gráfico de dispersão explicado

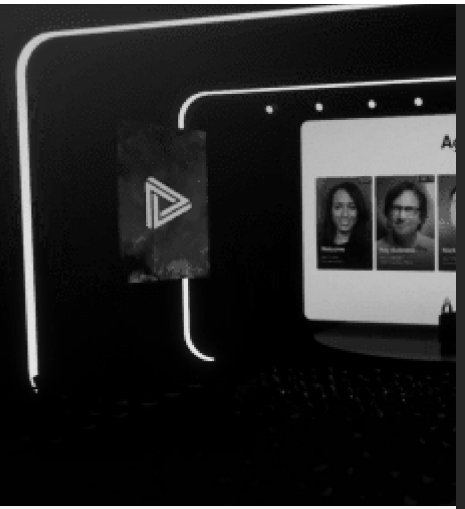
The x-axis represents ages, and the y-axis represents speeds.

What we can read from the diagram is that the two fastest cars were both 2 years old, and the slowest car was 12 years old.

Note: It seems that the newer the car, the faster it drives, but that could be a coincidence, after all we only registered 13 cars.



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Random Data Distributions

In Machine Learning the data sets can contain thousands-, or even millions, of values.

You might not have real world data when you are testing an algorithm, you might have to use randomly generated values.

As we have learned in the previous chapter, the NumPy module can help us with that!

Let us create two arrays that are both filled with 1000 random numbers from a normal data distribution.

The first array will have the mean set to 5.0 with a standard deviation of 1.0.

A segunda matriz terá a média definida como 10,0 com um desvio padrão de 2,0:

Exemplo

Um gráfico de dispersão com 1000 pontos:

```
import numpy
import matplotlib.pyplot as plt

x = numpy.random.normal(5.0, 1.0, 1000)
y = numpy.random.normal(10.0, 2.0, 1000)

plt.scatter(x, y)
plt.show()
```

Resultado:

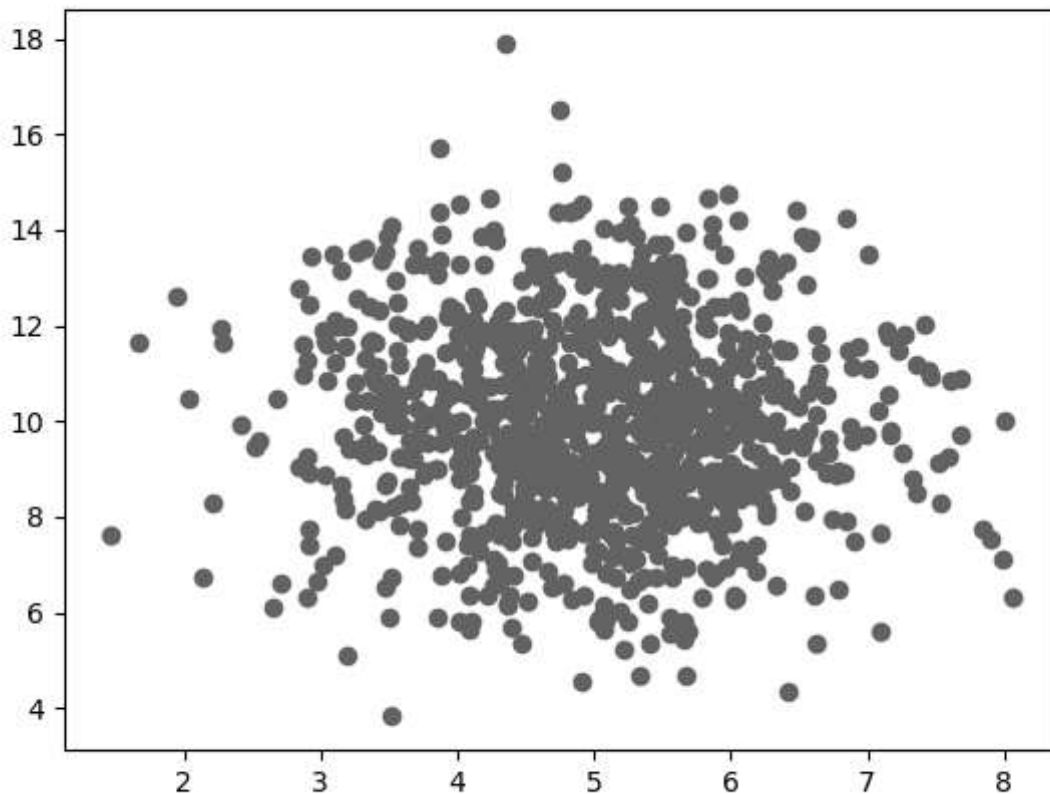
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Gráfico de dispersão explicado

Podemos ver que os pontos estão concentrados em torno do valor 5 no eixo x e 10 no eixo y.

Também podemos ver que o spread é maior no eixo y do que no eixo x.

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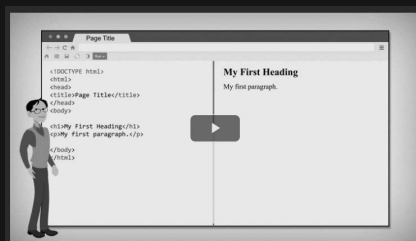
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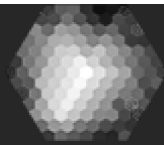
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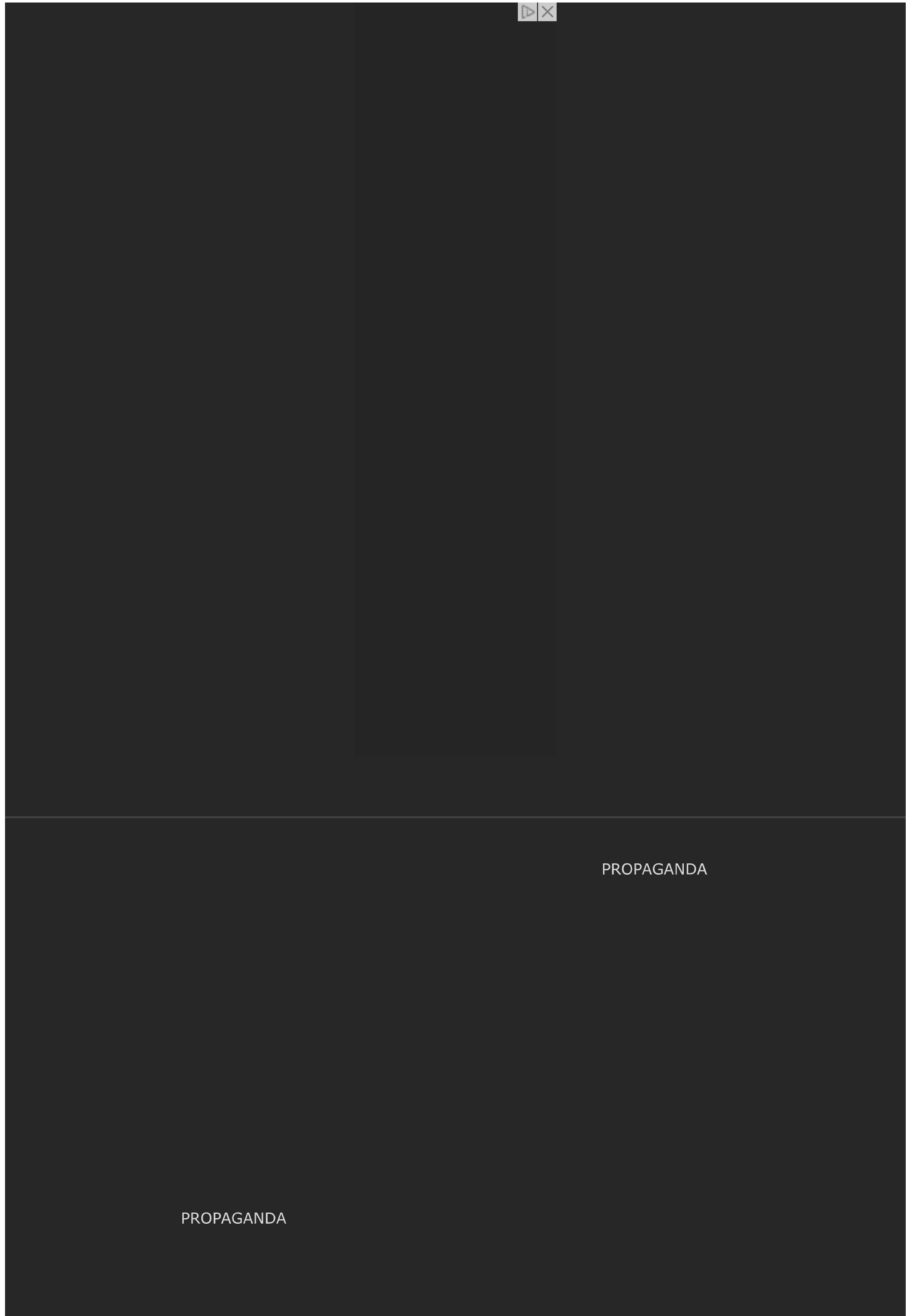
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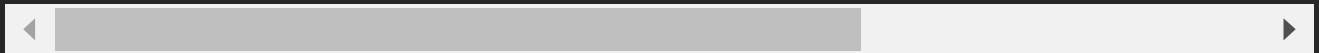
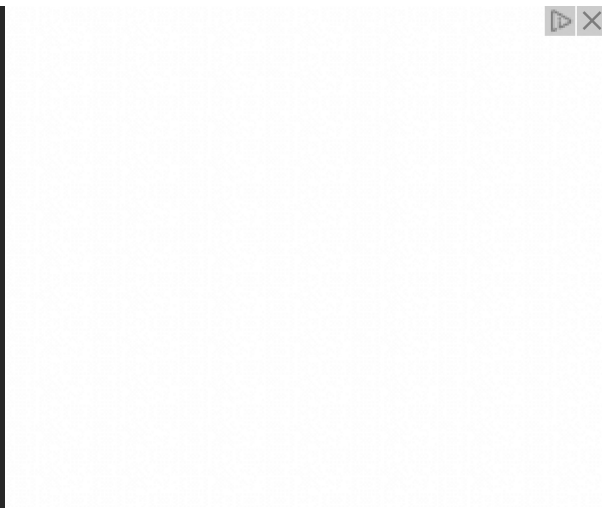
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