Unit03 Ex4 polynomial_regression

July 27, 2023

18 cars passing a certain tollboth at different time of the day (x) with different speed (y)

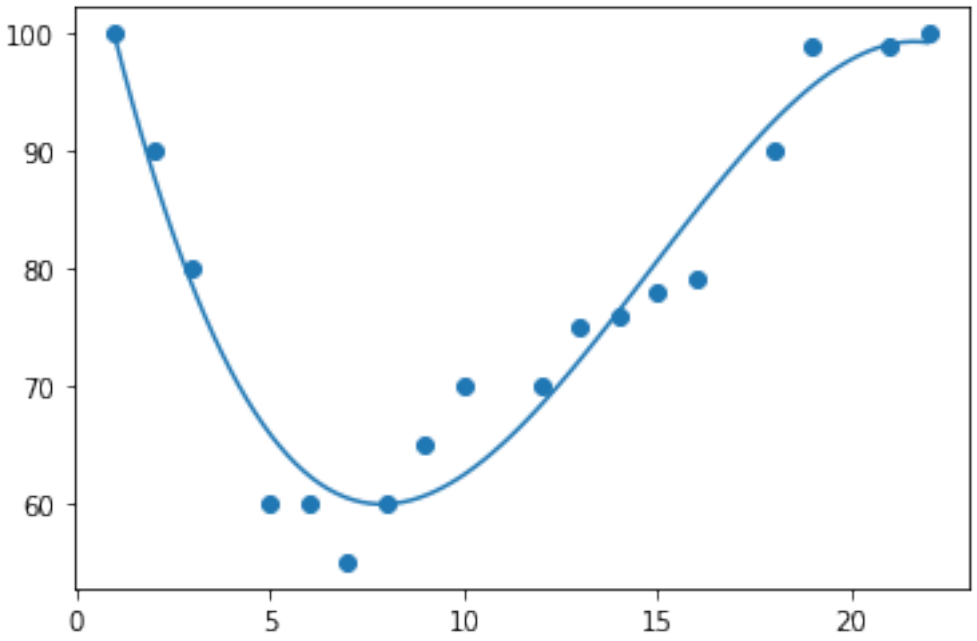
[2]:
```
import numpy
import matplotlib.pyplot as plt

x = [1,2,3,5,6,7,8,9,10,12,13,14,15,16,18,19,21,22]
y = [100,90,80,60,60,55,60,65,70,70,75,76,78,79,90,99,99,100]

#NumPy has a method that lets us make a polynomial model
mymodel = numpy.poly1d(numpy.polyfit(x, y, 3))

#specify how the line will display, we start at position 1, and end at position␣
 ↪22
myline = numpy.linspace(1, 22, 100)

plt.scatter(x, y)
plt.plot(myline, mymodel(myline))
plt.show()
```



It is important to know how well the relationship between the values of the x- and y-axis is, if there are no relationship the polynomial regression can not be used to predict anything.

The relationship is measured with a value called the r-squared.

The r-squared value ranges from 0 to 1, where 0 means no relationship, and 1 means 100% related

[3]:
```
import numpy
from sklearn.metrics import r2_score

x = [1,2,3,5,6,7,8,9,10,12,13,14,15,16,18,19,21,22]
y = [100,90,80,60,60,55,60,65,70,70,75,76,78,79,90,99,99,100]

mymodel = numpy.poly1d(numpy.polyfit(x, y, 3))

print(r2_score(y, mymodel(x)))
```

```
0.9432150416451027
```

0.1 Predict Future Values

Let us try to predict the speed of a car that passes the tollbooth at around 17 P.M

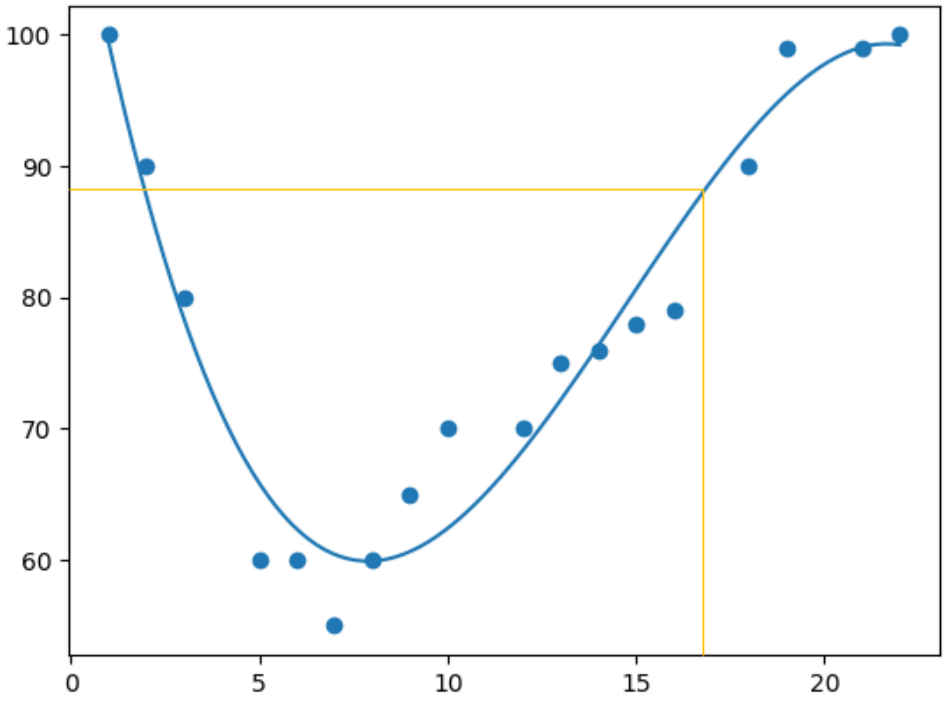
[4]:
```
import numpy
from sklearn.metrics import r2_score

x = [1,2,3,5,6,7,8,9,10,12,13,14,15,16,18,19,21,22]
y = [100,90,80,60,60,55,60,65,70,70,75,76,78,79,90,99,99,100]

mymodel = numpy.poly1d(numpy.polyfit(x, y, 3))

speed = mymodel(17)
print(speed)
```

```
88.87331269697987
```


100
90
80
70
60
0
5
10
15
20

[ ]: