Multiple Linear Regression. In-class Exercise 2

EL-GY 6143 Intro Machine Learning. Prof. Sundeep Rangan

Question

From the lecture slides.

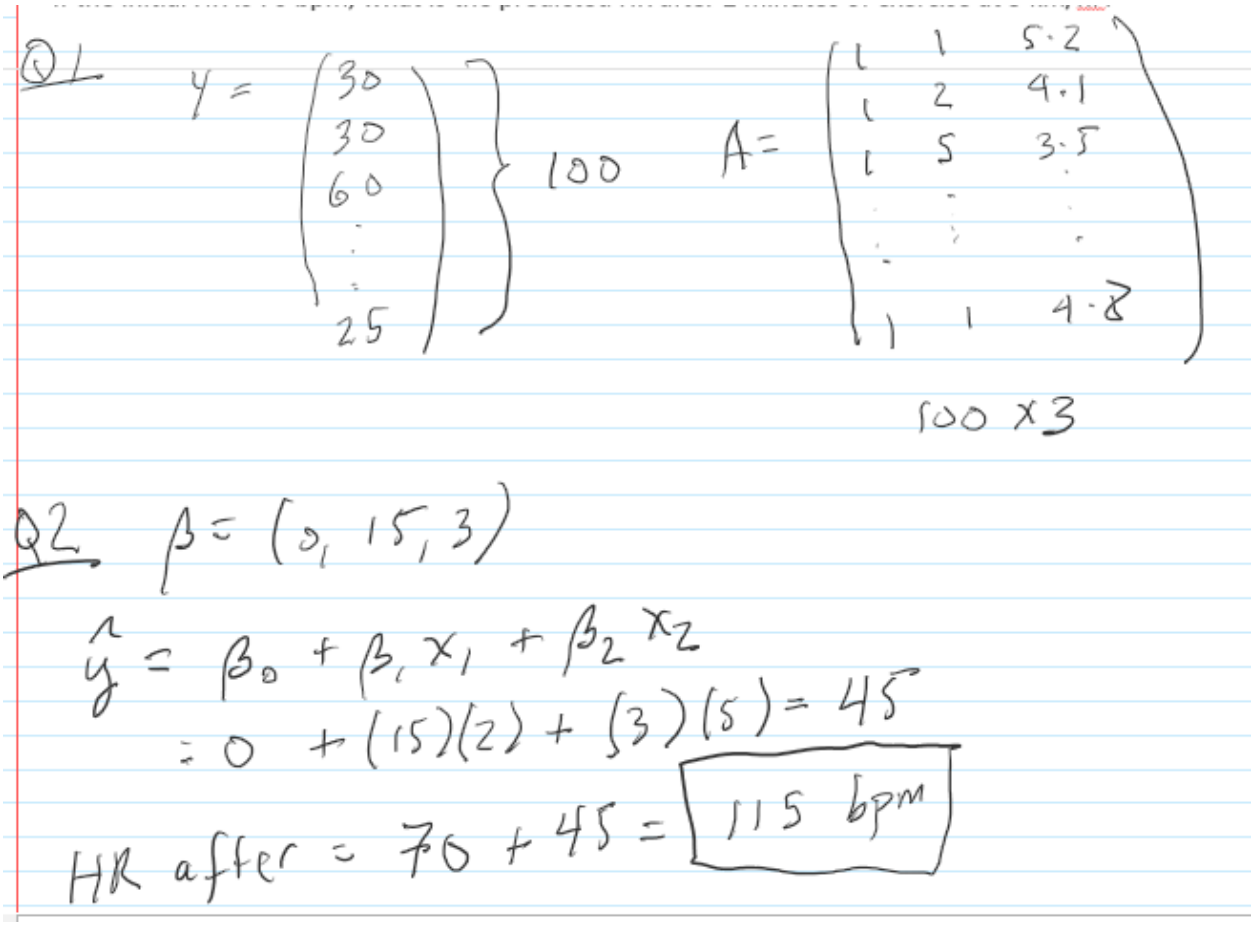
- Linear Model: $[\text{HR increase}] \approx \beta_0 + \beta_1[\text{mins exercise}] + \beta_2[\text{exercise intensity}]$
- Data

Subject number	HR before	HR after	Mins on treadmill	Speed (min/km)	Days exercise / week
123	60	90	1	5.2	3
456	80	110	2	4.1	1
789	70	130	5	3.5	2
⋮	⋮	⋮	⋮	⋮	⋮
283	75	100	1	4.8	0

100 subjects

- Q1: What is feature matrix A and target vector y for this problem
  - Fill in only the values in the first three rows and last row
- Q2: Suppose, after training, we find parameters $\beta = (0,\ 15,\ 3)$.
  If the initial HR is 70 bpm, what is the predicted HR after 2 minutes of exercise at 5 km/hr?

Solution


Q1
y =
30
30
60
25
100
A =
1 1 5.2
1 2 4.1
1 5 3.5
1 1 4.8
100 x 3
Q2
β = (0, 15, 3)
ŷ = β0 + β1 x1 + β2 x2
= 0 + (15)(2) + (3)(5) = 45
HR after = 70 + 45 = 115 bpm