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# SQL - Assignment 1

Q5

| Age | Loan (million dollars) | HPI | BHK |
|---|---|---|---|
| 25 | 40 | 135 | 2 |
| 35 | 60 | 256 | 3 |
| 45 | 80 | 231 | 3 |
| 20 | 20 | 267 | 4 |
| 35 | 120 | 139 | 4 |
| 52 | 18 | 150 | 2 |
| 23 | 95 | 127 | 2 |
| 40 | 62 | 216 | 4 |
| 60 | 100 | 139 | 2 |
| 48 | 220 | 250 | 3 |
| 33 | 150 | 264 | 4 |

=> Now for the instance : Age => 37 ; Loan => 142 ; We need to find values of HPI (continuous) and BHK (discrete) using k NN. for k = 1, 2 and 3.

• Steps for k NN:

(i) We calculate distance of test instance with each training instance. For simplicity we don't take the square root of sum of squares while calculating euclidean distance.

→ Age = 25 ; Loan = 40 :

$d = (25-37)^2 + (40-142)^2 \Rightarrow 144 + 10,404 = 10,458$

→ Age = 35 ; Loan = 60 :

$d = (35-37)^2 + (60-142)^2 \Rightarrow 4 + 6,724 = 6,728$

→ Age = 45 ; Loan = 80 :

$d = (45-37)^2 + (80-142)^2 \Rightarrow 3,908$

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→ Age = 20 ; Loan = 20 :
$d = (20-37)^2 + (20-142)^2 = 15,173$

→ Age = 35 ; Loan = 120 :
$d = (35-37)^2 + (120-142)^2 = 488$

→ Age = 52 ; Loan = 18 :
$d = (52-37)^2 + (18-142)^2 = 15,601$

→ Age = 23 ; Loan = 95 :
$d = (23-37)^2 + (95-142)^2 = 2,405$

→ Age = 40 ; Loan = 62 :
$d = (40-37)^2 + (62-142)^2 = 6,409$

→ Age = 60 ; Loan = 100 :
$d = (60-37)^2 + (100-142)^2 = 2,293$

→ Age = 48 ; Loan = 220 :
$d = (48-37)^2 + (220-142)^2 = 6,205$

→ Age = 33 ; Loan = 150 :
$d = (33-37)^2 + (150-142)^2 = 80$

- The nearest neighbour to test instance is with Age = 33 ; Loan = 150.
- The second nearest neighbour is with Age = 35 ; Loan = 120.
- The third nearest neighbour is with Age = 60 ; Loan = 100.

→ For k = 1 :
∴ BHK = 4
HPI = 264

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- For k = 2:

  BHK: 4

  HPI = (264 + 139)/2 = 201.5

- For k = 3:

  BHK: 4

  HPI = (264 + 139 + 139)/3 = 180.66