

4.1 Distance Calculations

Data Points: (median Income, House Price)

Point 1: (5.6431, 3.413)

Point 2: (1.9274, 1.223)

Point 3: (1.9479, 0.895)

1. Euclidean Distance: Points 1 & 2

$$\begin{aligned} & \sqrt{(5.6431 - 1.9274)^2 + (3.413 - 1.223)^2} \\ &= \sqrt{(3.7157)^2 + (2.19)^2} = \sqrt{13.8064 + 4.7961} \\ &= \sqrt{18.6025} = \boxed{4.3131} \end{aligned}$$

$$\text{euclidean_distance}(p1, p2) = 4.3131 \checkmark$$

2. Manhattan Distance: Points 1 & 3

$$\begin{aligned} & |5.6431 - 1.9479| + |3.413 - 0.895| \\ &= 3.6952 + 2.518 = \boxed{6.2132} \end{aligned}$$

$$\text{manhattan_distance}(p1, p3) = 6.2132 \checkmark$$

3. Minkowski Distance: $p=3$, Points 2 & 3

$$\begin{aligned} & ((|1.9274 - 1.9479|^3) + (|1.223 - 0.895|^3))^{1/3} \\ &= ((0.0205)^3 + (0.328)^3)^{1/3} \\ &= ((0.00001) + (0.03529))^{1/3} = (0.0353)^{1/3} \\ &= \boxed{0.328} \end{aligned}$$

$$\text{minkowski_distance}(p2, p3, p=3) = 0.328 \checkmark$$