

# Assignment-4 CS-4783/5783

Q1.) Conditional probability with normal distribution:

$$\hat{P}(x_i | C = c_i) = \frac{1}{\sqrt{2\pi} \sigma_{ji}} \exp \left( - \frac{(x_i - \mu_{ji})^2}{2 \sigma_{ji}^2} \right)$$

where,

$\mu_{ji}$  = mean of attribute values  $x_i$  of examples for which  $C = c_i$

$\sigma_{ji}$  = standard deviation of attribute values  $x_i$  of examples for which  $C = c_i$

We'll be using no. of rooms first, as it is continuous,  
from the given data.

| Rooms | Apartment | House | Condo. |
|-------|-----------|-------|--------|
| 5     | 1/7       | 1/7   | 0/6    |
| 6     | 2/7       | 4/7   | 4/6    |
| 7     | 2/7       | 2/7   | 1/6    |
| 8     | 1/7       | 0/7   | 0/6    |
| 9     | 1/7       | 0/7   | 0/6    |
| 10    | 0/7       | 0/7   | 1/6    |

| Bathrooms | Apartment | House | Condo. |
|-----------|-----------|-------|--------|
| 1         | 5/7       | 6/7   | 4/6    |
| 1.5       | 1/7       | 1/7   | 1/6    |
| 2.5       | 1/7       | 0/7   | 1/6    |

| Garages | Apartment     | House         | Condo.        |
|---------|---------------|---------------|---------------|
| 0       | $\frac{1}{7}$ | $\frac{2}{7}$ | $\frac{0}{6}$ |
| 1       | $\frac{3}{7}$ | $\frac{2}{7}$ | $\frac{4}{6}$ |
| 1.5     | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{0}{6}$ |
| 2       | $\frac{2}{7}$ | $\frac{2}{7}$ | $\frac{2}{6}$ |

| Bed rooms | Apartment     | House         | Condo.        |
|-----------|---------------|---------------|---------------|
| 2         | $\frac{1}{7}$ | $\frac{1}{7}$ | $\frac{0}{6}$ |
| 3         | $\frac{3}{7}$ | $\frac{5}{7}$ | $\frac{5}{6}$ |
| 4         | $\frac{2}{7}$ | $\frac{1}{7}$ | $\frac{0}{6}$ |
| 5         | $\frac{1}{7}$ | $\frac{0}{7}$ | $\frac{1}{6}$ |

Mean of local price = 6.80749  
 Variance of local price = 9.9271

Mean of Land area = 6.265  
 Variance of Land area = 6.395

Mean of Living area = 1.47985  
 Variance of Living area = 0.3801.

|              | Mean    | Variance |
|--------------|---------|----------|
| Apartment    |         |          |
| Local Price  | 7.3327  | 11.2075  |
| Land Area    | 6.1039  | 9.1010   |
| Living Area  | 1.5050  | 0.4249   |
| Age of house | 38.7142 | 184.7755 |

|              |         |          |
|--------------|---------|----------|
| House        |         |          |
| Local Price  | 5.7607  | 0.2786   |
| Land Area    | 6.6309  | 4.3353   |
| Living Area  | 1.3917  | 0.0389   |
| Age of house | 34.2857 | 138.7755 |

|              |         |          |
|--------------|---------|----------|
| Condo        |         |          |
| Local Price  | 7.4159  | 17.7197  |
| Land Area    | 6.0247  | 5.3966   |
| Living Area  | 1.5533  | 0.7106   |
| Age of house | 39.6667 | 162.2222 |