ML-HW4: Conditional probability

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Conditional probability

There are three features (20 training instances), Apartment (7), House (7), and Condo (6). We will denote them as A, H, C now.

$$P(A) = \frac{7}{20}, \quad P(B) = \frac{7}{20}, \quad P(C) = \frac{6}{20}$$

Local price, land area, living area, age of home- these 4 features have continuous values and can be estimated from a normal distribution using their mean and standard deviation. For these features, we compute the probability density values.

For example, if Condos have local prices 4.54, 3.89, 5.89, 16.42, 5.96, 7.78 - their standard deviation and mean are 7.41 and 4.21. All the local prices for condo will follow the normal distribution with these STD and mean. We following that distribution, we can compute any other probability density value.

Here I have computed all the discrete features. All of them are in detail, in a sense that the probabilities are # of events over the # of times A (C/H) occurred.

0.1 Bathrooms

There are 1, 1.5, 2.5 bathrooms in 15, 3, and 2 instances.

$$P(1|A) = \frac{5}{7}$$

$$P(1|H) = \frac{6}{7}$$

$$P(1|C) = \frac{4}{6}$$

$$P(1.5|A) = \frac{1}{7}$$

$$P(1.5|H) = \frac{1}{7}$$

$$P(1.5|C) = \frac{1}{6}$$

$$P(2.5|A) = \frac{1}{7}$$

$$P(2.5|H) = 0$$

$$P(2.5|C) = \frac{1}{6}$$

0.2 Garages

There are 0, 1, 1.5, 2 Garages in 3, 9, 2, and 6 instances.

$$P(0|A) = \frac{1}{7}$$

$$P(0|H) = \frac{2}{7}$$

$$P(0|C) = 0$$

$$P(1|A) = \frac{3}{7}$$

$$P(1|H) = \frac{2}{7}$$

$$P(1|C) = \frac{4}{6}$$

$$P(1.5|A) = \frac{1}{7}$$

$$P(1.5|H) = \frac{1}{7}$$

$$P(1.5|C) = 0$$

$$P(2|A) = \frac{2}{7}$$

$$P(2|H) = \frac{2}{7}$$

$$P(2|C) = \frac{2}{6}$$

0.3 Rooms

There are 5,6,7,8,9,10 rooms in 2, 10, 5,1,1, and 1 instances.

$$P(5|A) = \frac{1}{7}$$

$$P(5|H) = \frac{1}{7}$$

$$P(5|C) = 0$$

$$P(6|A) = \frac{2}{7}$$

$$P(6|H) = \frac{4}{7}$$

$$P(6|C) = \frac{4}{6}$$

$$P(7|A) = \frac{2}{7}$$

$$P(7|H) = \frac{1}{7}$$
$$P(7|C) = \frac{1}{6}$$

$$P(8|A) = \frac{1}{7}$$
$$P(8|H) = 0$$
$$P(8|C) = 0$$

$$P(9|A) = \frac{1}{7}$$
$$P(9|H) = 0$$
$$P(9|C) = 0$$

$$P(10|A) = 0$$
$$P(10|H) = 0$$
$$P(10|C) = \frac{1}{6}$$

0.4 Bedrooms

There are 2,3,4,5 rooms in 2, 13, 3, and 2 instances.

$$P(2|A) = \frac{1}{7}$$
$$P(2|H) = \frac{1}{7}$$
$$P(2|C) = 0$$

$$P(3|A) = \frac{3}{7}$$
$$P(3|H) = \frac{5}{7}$$
$$P(3|C) = \frac{5}{6}$$

$$P(4|A) = \frac{2}{7}$$
$$P(4|H) = \frac{1}{7}$$
$$P(4|C) = 0$$

$$P(5|A) = \frac{1}{7}$$
$$P(5|H) = 0$$
$$P(5|C) = \frac{1}{6}$$