**Adopted data:** https://www.kaggle.com/c/house-prices-advanced-regression-techniques

**Github:**https://github.com/jiaa98/Monte\_Carlo

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**Assumptions before running the simulation:**

**Scenario:**

1. When the total price is low, if the garage cannot accommodate more cars and the house does not include central air conditioning. Generally speaking, the location of the house will be better.

1. When the total price is low, if the garage can accommodate more cars and the house includes central air conditioning. Generally speaking, the location of the house will be poor.

**Analysis summary:**

The decision depends on the house purchased with the assets in hand, whether the garage accommodates more vehicles and whether it contains air conditioning.

If the garage accommodates more vehicles and contains air conditioning, the less likely it is to buy a good lot at a low price. On the contrary, the garage accommodates fewer vehicles and does not contain air conditioning, the more likely it is to buy a better lot at a lower price.

**Monte Carlo simulation scenario and purpose:**

As a large investment, buying a house has become very important, but how can people buy a house with good lots and many rooms through low total price? It's hard to make decisions.

For the money owned by buyers, what kind of garage and location is the most suitable for a house

**Simulated uncertainty variables:**

1. Number of vehicles that can be accommodated in the garage

2. Is there a central air conditioner

1. Location of the house

**Specific operation steps:**

**1. Data analysis**

First, let's take a look at the number of vehicles that can be accommodated in the garage, as shown below. It can be seen from the figure that most houses can accommodate 2 vehicles in the garage, followed by 1 vehicle in the garage.

图表, 条形图

描述已自动生成

Secondly, take a look at the situation that the house contains central air conditioning. The specific situation is as follows. It can be seen from the figure that more than 90% of the houses contain central air conditioning

图表

描述已自动生成

Check the average price of houses in different sections again. The details are as follows:

图表

描述已自动生成

It can be seen from the figure that the average house price in noridge is higher, which shows that the geographical location is better; The average price of meadowv house is low and the geographical location is relatively poor.

Finally, check the number of vehicles in the garage, whether there is central air conditioning, and the average house price of different seats in the house. The details are as follows:图表

描述已自动生成

**2. View the overall distribution of data sales prices**

|  |  |  |  |
| --- | --- | --- | --- |
| **Serial number** | **parameter** | **numerical value** | **explain** |
| **1** | **Count** | **1460** | **Number of data** |
| **2** | **mean** | **180921** | **Average sales** |
| **3** | **std** | **79442** | **Sales variance** |
| **4** | **min** | **34900** | **Sales minimum** |
| **5** | **25%** | **129975** | **Sales 25% quantile** |
| **6** | **50%** | **163000** | **Sales 50% quantile** |
| **7** | **75%** | **214000** | **Sales 75% quantile** |
| **8** | **max** | **755000** | **Maximum sales** |

**3. Monte Carlo simulation**

Assuming that I have only 130000 (25% quantile) money in hand, what purchase schemes do I have? I use Monte Carlo simulation method to simulate 10000 times. Some final results are as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Serial number** | **Number of vehicles in the garage** | **central air-conditioning** | **Location of the house** | **Simulation selection times** |
| **1** | **0** | **Y** | **CollgCr** | **125** |
| **2** | **2** | **N** | **Edwards** | **119** |
| **3** | **0** | **N** | **OldTown** | **117** |
| **4** | **1** | **Y** | **MeadowV** | **116** |
| **5** | **1** | **N** | **IDOTRR** | **116** |
| **6** | **2** | **Y** | **Blueste** | **111** |
| **7** | **4** | **Y** | **NAmes** | **112** |
| **8** | **3** | **Y** | **NAmes** | **106** |
| **9** | **3** | **N** | **OldTown** | **84** |

**4.Conclusion:**

From the perspective of simulation, it can also be seen that when the money in hand is relatively small, the number of vehicles in the garage is large, and the location of the house with central air conditioning is generally not very good. If the garage can not accommodate vehicles and there is no central air conditioning, the location of the house will be relatively better.

**Reference:**

**<https://pbpython.com/monte-carlo.html>**

**<https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.640.3550&rep=rep1&type=pdf>**

**<https://www.palisade.com/risk/monte_carlo_simulation.asp>**

**<https://towardsdatascience.com/monte-carlo-simulations-with-python-part-1-f5627b7d60b0>**