

Monte Carlo Method

Calculate PI using Monte Carlo Method in Python 3

University of Ulsan IT Convergence

20152262 Hong Geun Ji

The following report covers Monte Carlo Method by calculating Pi.

The basic concept is as follows,

1. Embeds a circle in a rectangle.
2. Divide this figure into four parts.
3. Create points randomly from the rectangle.
4. Increase the number of points if it is in circle.
5. Repeat 3. and 4. as many as possible.
(Recommend you to do this more than 100000 times.)
6. Divide the number of points in the circle by the number of points in the rectangle.
7. Then multiply by 4.

Python 3 version

//

```
#  
# pi.py  
# Calculate Pi using Monte Carlo Method.  
#  
# Created by Ji Hong Geun on 25/11/18.  
# Copyright © 2018 Ji Hong Geun. All rights reserved.  
#
```

```
from random import *
```

```
n = int(input("Type the count : "))
```

```
inside = 0
```

```
for i in range(0,n):
```

```
    x = random()
```

```
    y = random()
```

```
    if (x**2 + y**2) <= 1: # if the dot is in circle part, increase the 'inside' value.
```

```
        inside += 1
```

```
Pi = 4 * inside/n          # since the 'inside' value is just for one of the four parts,  
                           # needs to multiply by 4.
```

```
print(Pi)
```

//

Result

```
Python 3.6.4 Shell
Python 3.6.4 (v3.6.4:d48eceed5, Dec 18 2017, 21:07:28)
[GCC 4.2.1 (Apple Inc. build 5666) (dot 3)] on darwin
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: /Users/ji/Desktop/pi.py =====
Type the count : 100000
3.1424
>>>
===== RESTART: /Users/ji/Desktop/pi.py =====
Type the count : 1000000
3.142108
>>>
===== RESTART: /Users/ji/Desktop/pi.py =====
Type the count : 10000000
3.1415508
>>>
```