Київський національний університет імені Тараса Шевченка Факультет комп’ютерних наук та кібернетики

Кафедра системного аналізу та теорії прийняття рішень

Звіт

з лабораторної роботи № 4

Статестичні методи в задачах штучного інтелекту

Виконала

студентка групи К-23 Аксьонова Є.Ю.

Прийняв Пашко А.О.

Київ – 2023

Код:

import random  
import pandas as pd  
  
N = 1000  
n = 100  
def general(K):  
 gen = []  
 [gen.append(random.random()) for \_ in range(K)]  
 return gen  
  
def simple\_rand\_no\_repeat(k, K, s):  
 sample = []  
 indexes = []  
 [indexes.append(random.randint(0, K-1)) for \_ in range(k)]  
 [sample.append(s[i]) for i in indexes]  
 return sample  
  
def bernoulli(k, K, s):  
 p = k/K  
 rands = general(K) #sequens of randoms 0-1, not another general set  
 sample = []  
 [sample.append(s[i]) for i in range(K) if rands[i] < p ]  
 return sample  
  
def systematic(k, K, s):  
 a = int(K/k - 1)  
 r = random.randint(1, a-1)  
 sample = []  
 range\_end = int(r+(k-1)\*a + 1)  
 [sample.append(s[i]) for i in range(r, range\_end, a)]  
 return sample  
  
def stratified(k, K, s):  
 s1 = simple\_rand\_no\_repeat(k, K, s)  
 s2 = bernoulli(k, K, s)  
 s3 = systematic(k, K, s)  
 return s1, s2, s3  
  
def calculations(k, K):  
  
 ##########0###########  
 general\_set = general(K)  
 gen\_sum = sum(general\_set)  
 gen\_mean = gen\_sum / K  
  
 ##########1###########  
 simple\_sample = simple\_rand\_no\_repeat(k,K, general\_set)  
 sum1 = sum(simple\_sample)  
 mean1 = sum1/k  
  
 ##########2###########  
 bernoulli\_sample = bernoulli(k,K, general\_set)  
 sum2 = sum(bernoulli\_sample)  
 mean2 = sum2/len(bernoulli\_sample)  
  
 ##########3###########  
 systematic\_sample = systematic(k,K, general\_set)  
 sum3 = sum(systematic\_sample)  
 mean3 = sum2/len(systematic\_sample)  
  
 ##########4###########  
 strat1, strat2, strat3 = stratified(k,K, general\_set)  
 sum4 = (sum(strat1) + sum(strat2) + sum(strat3))  
 mean4 = sum4 / (len(strat1) + len(strat2) + len(strat3))  
  
 sums = (gen\_sum, sum1, sum2, sum3, sum4)  
 means = (gen\_mean, mean1, mean2, mean3, mean4)  
  
 return sums, means  
  
def output(k, K):  
 sums, means = calculations(k, K)  
 df = pd.DataFrame([sums, means], ["sum", "mean"], columns = ["General", "Simple",  
 "Bernoulli", "Systematic",  
 "Stratified"])  
 print(f"######################## N = {K} ########################\n", df,"\n")  
  
output(n,N)  
output(n,10000)  
output(n,100000)  
output(n,1000000)

Вивід:

