

AA - Experiment 2 - Hiring Problem

60004200155

Jigar Siddhpura

C22

AA - Experiment 2

Aim: To study & implement hiring problem

Theory: Hiring problem is a classical problem in the field of algorithm & decision theory. It is mainly encountered in scenarios where there are a set of applicants based on certain criteria. It is often used to model scenarios where a manager is hiring candidates for a position & wants to maximize.

Simplified version of problem:

1. A manager is conducting a series of interviews for a single position.
2. The interviews are conducted one at a time & after each one he has to decide ~~whether~~ decide whether to hire or not.
3. The goal is to maximize probability of hiring best candidate.

Methods:

1. Define candidate info - Storing info about each candidate including name, cpga, experience, etc.
2. Input candidate - Prompt the user the number of candidate, info about each candidate, including their qualification & others also.
3. Assign probabilities: For each candidate, we calculate

probability of selection based on their info.

4. Probabilistic model: Random selection where each candidate has equal probability of being selected.
5. Evaluating cost - cost include hiring cost, interview cost, finding cost on each candidate based on organization, policies, historical data & industry standards.
6. Analyse candidate data & estimating likelihood of candidate being suitable for job whether to hire or fire candidate.

analysis of hiring using IRV

Let 'n' be a random var = no. of time we have new assistance.

Let 'n' be a ran IRV.

for i^{th} candidate, $x = \begin{cases} 1, & \text{hired} \\ 0, & \text{not hired} \end{cases}$

Conclusion: The experiment provides framework for selecting best candidate based on cost, probabilistic methods, etc. Based on multiple criteria, we hire or fire.

CODE :

```
import random
```

```
candidates = [0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
print("Candidates: ", candidates)
```

```
interviewed_candidates = []
hired_candidates = []
```

```
# Interview candidates in order
for candidate in candidates:
    interviewed_candidates.append(candidate)
    # Hire the best candidate so far
    if not hired_candidates or candidate > max(hired_candidates):
        hired_candidates.append(candidate)
```

```
# Calculate firing cost
firing_cost = len(hired_candidates) - 1 # Since the last candidate is the best
```

```
print("Normal way:")
print("Interviewed candidates:", interviewed_candidates)
print("Hired candidates:", hired_candidates)
print("Number of candidates hired:", len(hired_candidates))
print("Firing cost:", firing_cost)
```

```
candidates = [0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
print("\nCandidates: ", candidates)
```

```
interviewed_candidates = []
hired_candidates = []
```

```
print('\nRandomized Approach')
```

```
# Randomly select and interview candidates
for i in range(len(candidates)):
    selected_candidate = random.choice(candidates)
    interviewed_candidates.append(selected_candidate)
    candidates.remove(selected_candidate)
```

```

# Hire the best candidate so far
max_val = -1
for i in range(len(interviewed_candidates)):
    if interviewed_candidates[i] > max_val:
        max_val = interviewed_candidates[i]
        hired_candidates.append(interviewed_candidates[i])

# Calculate firing cost
firing_cost = len(hired_candidates) - 1 # Since the last candidate is the best

print("Interviewed candidates in randomized order:", interviewed_candidates)
print("Hired candidates:", hired_candidates)
print("Number of candidates hired:", len(hired_candidates))
print("Firing cost:", firing_cost)

```

OUTPUT :

```

PS D:\SEM-6\AA\EXPERIMENTS> python -u "d:\SEM-6\AA\EXPERIMENTS\hiring_problem.py"
Candidates: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
Normal way:
Interviewed candidates: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
Hired candidates: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9]
Number of candidates hired: 10
Firing cost: 9

Candidates: [0, 1, 2, 3, 4, 5, 6, 7, 8, 9]

Randomized Approach
Interviewed candidates in randomized order: [9, 8, 2, 5, 3, 0, 7, 1, 4, 6]
Hired candidates: [9]
Number of candidates hired: 1
Firing cost: 0
PS D:\SEM-6\AA\EXPERIMENTS>

```