UNIVERSITY OF ASIA PACIFIC

Project-1: Implementation of a small map (Home to UAP) using A*Search Algorithm

Course Title: Artificial Intelligence and Expert Systems Lab

Course Code: CSE 404

Submitted By:

Sararah Mahjabin

ID: 18101067

Sec: B(B1)

Submitted To:

Dr. Nasima Begum

Assistant Professor

Introduction: In this project, I have designed a small map from "**My Home (Jigatola) to University of Asia Pacific(Uap)**". Using this map, I have developed a search tree. Then implemented the map in a python program using A* search algorithm for getting an optimal solution, which will show the shortest path and lowest path cost.

Objective: This Project will help;

1. To find the shortest path from my home to uap.
2. To find the lowest path cost for traveling the path.

Designed Map:

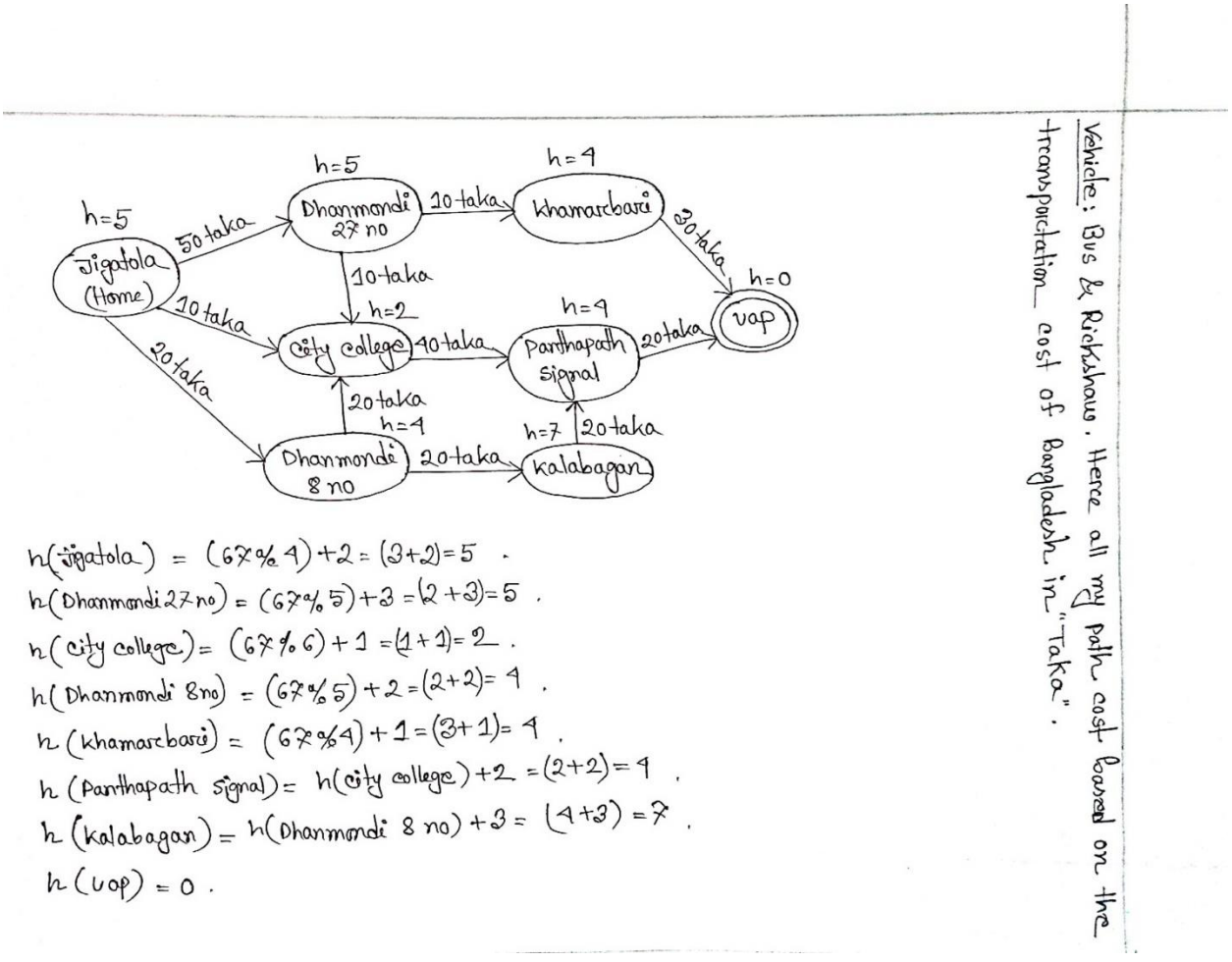

Fig:01

Search Tree:

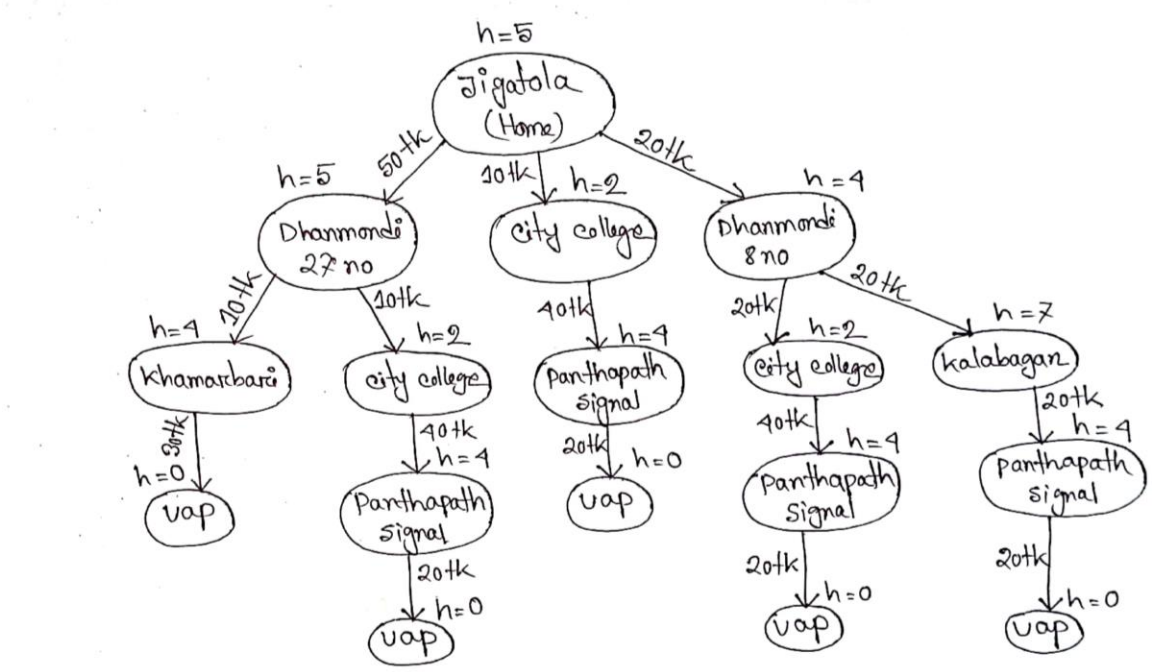

Fig:02

Implementation:

```
import pandas as pds
pds.set_option('mode.chained_assignment', None)
dframe = pds.read_csv('/content/drive/MyDrive/AI_Project/Project_AI.csv')
dframe

header = input('Give Start State : ')
goal = input('Give Goal State : ')

header,goal
dframe['g(n)'] = dframe['g(n)'].astype('int32')
dframe['h(n)'] = dframe['h(n)'].astype('int32')
path = [header]
sdframe = dframe.copy()

path_cost = 0
while True:
    if header==goal:
        break
```

```
    sdata = sdframe[sdframe.Parent==header]
    sdata['cost']=sdata[['g(n)','h(n)']].sum(axis=1)

    sdata=sdata.sort_values(by='cost',ascending=True).reset_index(drop=Tru
e)
    print(sdata)
    header = sdata.loc[0].Child
    path_cost+=sdata.loc[0]['g(n)']
    path.append(header)


print('Shortest path ',path)

print(path_cost)
```

Result Analysis: For solving this problem, I have used python and IDE was Google Colab. I have submitted a .py file in the classroom after download the code from Google Colab. I am attaching screenshot of my output that is the shortest path and total path cost below.

```
[43] print('Shortest path ',path)

     Shortest path  ['Jigatola', 'City College', 'Panthapath Signal', 'Uap']

[44] print(path_cost)

     70
```

From this output, it is clear that the shortest path for travelling from my home(Jigatola) to Uap is: Jigatola -> City College -> Panthapath Signal -> Uap.

For this total path, the path cost is: 70 Taka.

Conclusion: This project is helpful to find the optimal solution of any map using A* search algorithm. Using this project, I have got exactly the same path as output which I use every day for going uap from my home. During doing this project I faced a lot of errors in my code but I have successfully solved them all. I have learned a lot of new things like taking dataset from .csv file and also about pandas.