**IT3160E INTRODUCTION TO ARTIFICIAL INTELLIGENCE**

**CAPSTONE PROJECT**

**Class: 131117**

**Lecturer: Than Quang Khoat**

1. **GROUP INFO**

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| --- | --- | --- |
| **Name** | **Student ID** | **Task** |
| Nguyen Khanh Trung | 20205133 | Team Management, implementing GBFS, Data Analysis, Writing Report |
| Nguyen Phuong Quang | 20205191 | Researching and importing Data, Implementing UCS |
| Hoang Van Phuong | 20200478 | Exporting Data, Visualization, Making SlideShow |
| Bui Van Thanh | 20200585 | Implementing A\*, Data Analysis |

1. **PROBLEM DESCRIPTION**

Problem: Route Planning

*Overview*

We’re a writing a program to find the shortest route between two Vietnamese cities (e.g. Hanoi and Hai Phong). The intelligent vehicle can only travel between 2 adjacent cities, and the objective is to minimize the number of kms between two cities.

*Approach*

We’re writing the program to solve the problem through implement three different appropriate search algorithms: Uniform-cost Search (UCS), Greedy Best First Search (GBFS) and A\* search.

The program will have several outputs for each of the search algorithms:

* Time complexity (number of nodes expanded in order to solve the route planning problem)
* Space complexity (number of nodes kept in memory)
* The path used to solve the route planning problem (solution) if there was a solution
* The cumulated number of km of the solution (if any)

There’ll also be deep analysis and comparison between the three algorithms and visualization for the solution.

1. **DETAILS**

*Input*

The cities list and distance list between cities will then be read from an json file having the following format:

The starting city and ending city will be fixed randomly.

*Output*

The program will have several outputs:

* Time complexity (number of nodes expanded in order to solve the route planning problem)
* Space complexity (number of nodes kept in memory)
* The path used to solve the route planning problem (solution) if there was a solution
* The cumulated number of km of the solution (if any)

*Algorithms*

We’re planning to use Uniform-cost search, Greedy best first search and A\* search algorithm with the heuristic function h(n) = the estimated straight-line distance (flying distance) from n to the goal city.

*Applications*

Optimized Travelling, Delivery and many more.