Software Engineering Project

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Outline

- Tools and resources
- Methodology
- C++ implementation
- Matlab implementation

Tools and resources

IDE

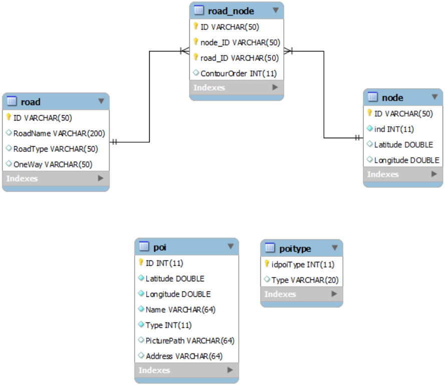
- Qt 5.1 with OpenGL
- Matlab 2013Ra

Group meetings and coordination

- Trello
- Git and Bitbucket

Database

- MySQL Server 5.6
- PostgreSQL



road_node
ID VARCHAR(50)
node_ID VARCHAR(50)
road_ID VARCHAR(50)
ContourOrder INT(11)
Indexes

road
ID VARCHAR(50)
RoadName VARCHAR(200)
RoadType VARCHAR(50)
OneWay VARCHAR(50)
Indexes

node
ID VARCHAR(50)
ind INT(11)
Latitude DOUBLE
Longitude DOUBLE
Indexes

poi
ID INT(11)
Latitude DOUBLE
Longitude DOUBLE
Name VARCHAR(64)
Type INT(11)
PicturePath VARCHAR(64)
Address VARCHAR(64)
Indexes

poitype
idpoiType INT(11)
Type VARCHAR(20)
Indexes

Figure : Database tables

C++ Implementation

Creating the map

The shortest path

Route path

Heuristics

Normalization and displaying

Selecting a route

Matlab implementation

Getting the data

- PostgreSQL database
- Queries were made only once.
- Created objects can be saved in .MAT files
- No need to recreate object on each program start

Matlab implementation

Data Structure

- Objects of 4 classes were constructed.
- No pointers in Matlab.
- Solution: handle classes.

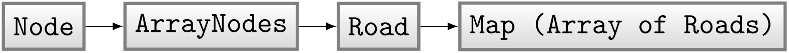


Figure : Simplified diagram of relationship of a classes

Matlab implementation

The shortest path

- Dijkstra's algorithm
- Determine the window on which the closest nodes and projections will be searched.
- Find the closest node on determined window.
- Find the closest projection (if possible) on the same window.
- Update the adjacency matrix according shortest distance.

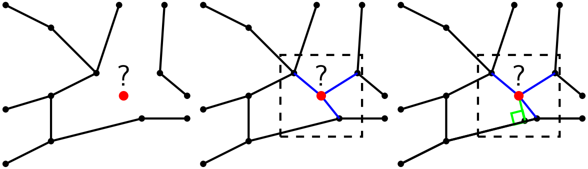
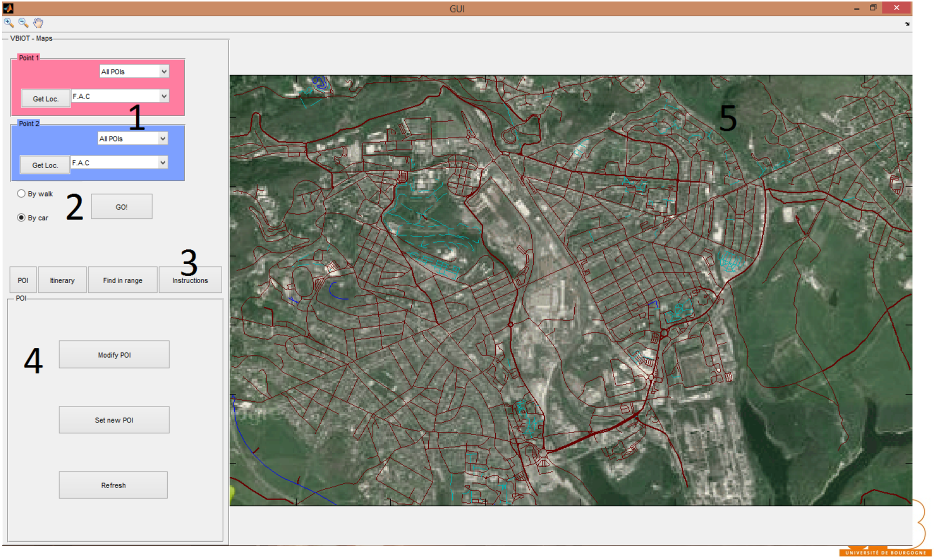


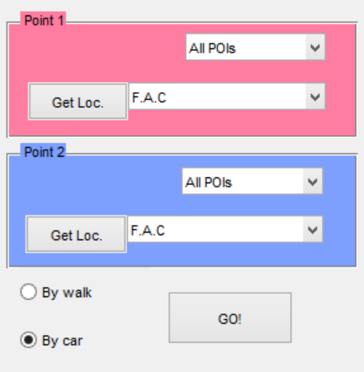
Figure : Finding the shortest point/projection for the random point on window domain

Graphical User Interface (GUI)



Insertion of points

- Point from a list
- Filter by class
- Get Location from the map
- Walk / Car
- GO!



Point 1

All POIs

F.A.C

Point 2

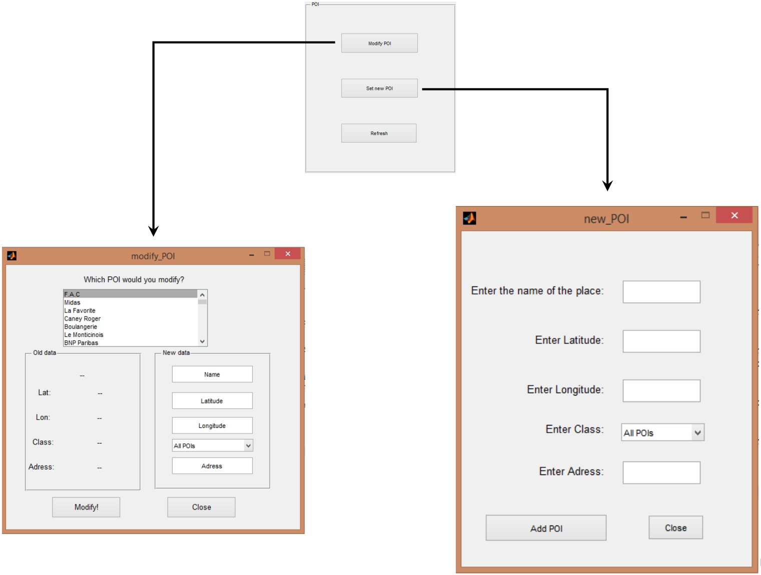
All POIs

F.A.C

○ By walk

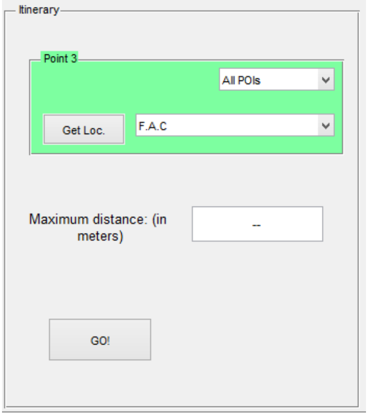
● By car

Manipulating Points of interest



Itinerary

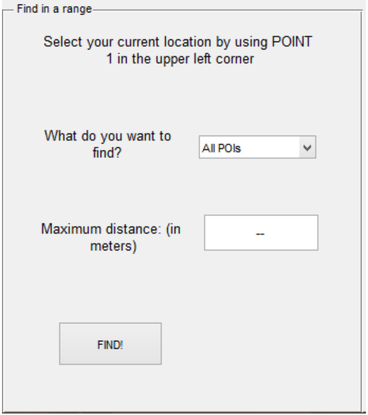
- Adding a third point
- Getting and storing the distance
- How it works
- Cost of time



Maximum distance: (in meters) --

Find in a Range

- Using Point 1 data
- Selection of classes
- Distance
- Slow process



Find in a range

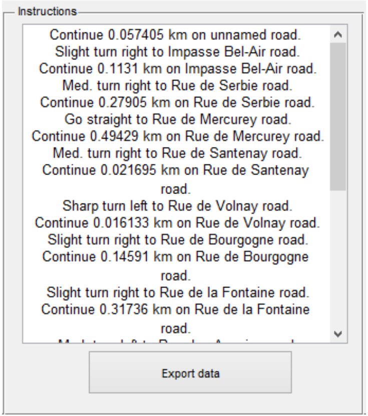
Select your current location by using POINT 1 in the upper left corner

What do you want to find? All POIs

Maximum distance: (in meters) --

Generation of the instructions

- Generating instructions from shortest path
- Setting a scroll bar
- Exporting this data
- Default text when missing data



Instructions

Continue 0.057405 km on unnamed road.
Slight turn right to Impasse Bel-Air road.
Continue 0.1131 km on Impasse Bel-Air road.
Med. turn right to Rue de Serbie road.
Continue 0.27905 km on Rue de Serbie road.
Go straight to Rue de Mercurey road.
Continue 0.49429 km on Rue de Mercurey road.
Med. turn right to Rue de Santenay road.
Continue 0.021695 km on Rue de Santenay road.
Sharp turn left to Rue de Volnay road.
Continue 0.016133 km on Rue de Volnay road.
Slight turn right to Rue de Bourgogne road.
Continue 0.14591 km on Rue de Bourgogne road.
Slight turn right to Rue de la Fontaine road.
Continue 0.31736 km on Rue de la Fontaine road.

Conclusions

Thank you for attention!

Questions?