Masters in Computer Vision
Software Engineering Project
2013-2014

1 – Introduction

The goal of this project is to develop a software to locate various buildings, such as schools, university buildings, major offices, hospitals, various shops, streets, roads, parcs, and other interesting points in Le Creusot, in a similar way as what google earth does.

In other words, the software has to be able to propose adequate itineraries depending on various requests. For instance, the software should be able to answer the following questions:

- What is the shortest path to walk from the IUT to the Centre Universitaire Condorcet?
- Can you provide an itinerary that is at most 5km long, that passes by a bakery, that starts in Résidence Jean Moulin, and that ends in the Résidence Acacia?
- How can I walk from the Centre Universitaire Condorcet to a grocery store?
- I want to visit the Parc de la Verrerie...
- How much time does it take to drive from the train station to Condorcet?
- How many grocery stores are located within a 3km radius from Jean Moulin residence?
- Where is the post office?

As you probably already understood, this software can be seen as a very useful help for someone who does not know the city of Le Creusot. Think of it as a software that should answer most of your questions regarding locations of facilities and shops.

2 – Project requirement and constraints

- Input /output files: the points of interest can be loaded/saved/modified by the user
- The result of a request should be displayed using an OpenGL or OpenCV window (in your C++ implementation) and a text version should be exported in the format of your choice
- The user can select the beginning and the end of his itinerary directly from the screen, or by selecting appropriate items using any kind of menus/lists, depending on your windowing system and implementation
- At least, the following locations have to be available in your software
  - IUT and Condorcet (several buildings, library, lab, class rooms, etc)
  - **at least** 3 grocery stores, 5 restaurants, 3 fast food places, 3 bakeries
  - Cultural places, such as Parc de la verrerie, the theater, the concert room (ARC), and any other place you deem important
  - **at least 20** other shops (hair cut, sportwear, clothes)...
- Apart from the buildings, major roads and streets have to be present. The program should distinguish if you can walk and/or drive. For instance, you cannot drive a car into the Parc de la Verrerie, but you can walk from IUT to Condorcet even if you

follow a road...

- You can use google map to create some images offline to spare you some time, but your program **MUST NOT** send requests to google. In other words, you have to create your own google map, not interface the existing one.

3 – Deliverables

You should provide a functional software with a graphical user interface, **with two implementations : one in C++ and a second one in Matlab.** The deliverables include, at least, the following items:

- Complete source code + libraries + makefile and any help file to compile your program.
- Report in .pdf format
- Defense presentation, 20 min (.ppt, .odp, .pdf format) : 2nd week of January
- **All deliverables, except the defense prensentation, should be returned by Sunday January the 5th**

You will be assessed on the following items
- Report, no page limit
- Intermediate report(s) if any, and project management.
- Problem analysis: Critical choices of structures, classes, and their implementation
- Strategy for building the user requests and their interpretation
- Path computation algorithms
- User interface. Easiness of use (menus, mouse clicks, various options, etc)
- OpenGL / OpenCV integration
- Powerpoint Presentation of your work (end of semester) and demo
- Comparison and discussion between implementation in Matlab against C++
- Originality and optional (but useful) work: if you think you can go further, do it. These options will be considered as bonuses in the final grade of your project

Ethics and advices
- If you use or adapt some source code from internet, mention it.
- Groups of **4 students** per project **at most**
- The list (cartography) of the required items can be done in collaboration with all the students
- To obtain the accurate locations of buildings and texture map, use google earth, see illustration next page.
- This project is ambitious and requires some deep reflection before coding
  ○ Take the time to prepare and sharpen your analysis.
  ○ Manage your time efficiently
  ○ Do not focus to much on specific details if something is not fully working
  ○ Do not wait the very last weeks to start working on your project
  ○ In case of problem, for any question regarding this project, or if you want to have some feedback on your project while working on it, do not hesitate to contact me at yohan.fougerolle@u-bourgogne.fr