School of Engineering
Bachelor's degree in Artifitial Intelligence

PARALLEL PROGRAMMING

Practical problems C programming

Group members:

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INTRODUCTION

In this optional problem, we ask you to generate a C function library with the functions that implement the Kmeans algorithm and develop a Python module that imports this feature library and implements the Python functions that allow natural use of these functions from within a Python program.

What we are asking in this exercise is the creation of a function library in C from the code available in kmeanslib.c and a Python module that implements an interface that allows the use of these functions from a Python program (eventually, you could write a Python script that reproduces the functionality implemented in the main included in kmeans.c).

To do this, you must first decide which data structures you need to create in Python in order to translate the corresponding C structures. You can make changes to Python structures, as the design of C structures can be improved in some cases.

Second, you need to write the Python functions that implement the interface with the C functions that the user needs to achieve the provided functionality (read an image, write an image, run kmeans, etc.).

It is important that you think carefully about what structures and functions need to be implemented in Python, that Python functions control the types of arguments of the C function and the return type.

We do not ask you in this exercise to implement C main in Python, although you can do so, as long as it is in a separate script (kmeans' Python module can be imported by other modules). However, you should include the necessary tests to show that your interface is working, that means you must write code that checks that the features do what you expect. This code will only be executed if the implemented module runs directly (use il __name__ == "__main__").

In short, you need to achieve:

1. Create the C feature library (kmeanslib.so)
2. Python data structures that translate into C structures requested by C functions.
3. Python functions that implement the interface with the C functions of the library that the user will need.
4. Test code.

DELIVERY

The module kmeanslib.py with the implementation of the Python interface of the kmeanslib.c library. In the documentation (comments) of the module you must include how you created the kmeanslib.so library.