Rapport de projet: Phase 5

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Lien Github du code: **Branche Phase 5 du projet**

Il y a une réplique du code dans "projet\phase5\main.jl"

Toute les combinaisons sont testés "projet\phase5\best_parameters_search.jl"

```
reconstruct_image (generic function with 5 methods)
```

Voici la fonction principale qui permet de créeer les images reconstruites

```
function reconstruct_image(filename_stsp::String, view::Bool=false, MST_Algorithm=1, step_method
=3, nb_iteration=10)
    root = normpath(joinpath(@__FILE__,"..","..",".."))
    filepath_to_stsp = "instances\\tsp\\instances"
    filepath = joinpath(root, filepath_to_stsp)
    filepath = joinpath(filepath, filename_stsp * ".tsp")

    """Reading data form data files"""
    header = read_img_header(filepath)
    graph_nodes, graph_edges, edges_weight = read_img_stsp(filepath)

    #creating the main graph
    Main_Graph = MarkedGraph("Graph_image", MarkedNode{Array{Float64,1}}[], MarkedEdge{Array{Flo
at64,1}}[])
    create_img_Graph!(Main_Graph, graph_nodes, graph_edges, edges_weight)

    # solving the TSP problem using Held and Karp algorithm
    W2, HK_Graph = HK_MST(Main_Graph, MST_Algorithm, Main_Graph.nodes[1], step_method, nb_iterat
ion) # method::Int64=0, t_step::Float64 = -1.0, stop_method::Int64 = 0)

    New_TSP, tour_W = create_tour!(deepcopy(HK_Graph), Main_Graph, W2)
    println("The weight of TSP Tour: ", tour_W)


    start_e = New_TSP.edges[findall(x->x.adjacentnodes[1].name == "1", New_TSP.edges)][1]
    Edge_list = create_touredge_list!(New_TSP, start_e)
    node_tour = Tour_nodes_list(New_TSP)

    path_name_tour = joinpath(normpath(joinpath(@__FILE__,"..")),"tour_and_reconstructed_image",
"tour_" * filename_stsp * ".tour")
    write_tour(path_name_tour, node_tour, convert(Float32, tour_W))
    inputpath_to_stsp = "instances\\images\\shuffled"

    inputpath = joinpath(root, inputpath_to_stsp)

    inputpath_to_shuffle_image = joinpath(inputpath, filename_stsp * ".png")
    path_reconstructed_image = joinpath(normpath(joinpath(@__FILE__,"..")),"tour_and_reconstruct
ed_image", "construted_" * filename_stsp * ".png")
    reconstruct_picture(path_name_tour, inputpath_to_shuffle_image, path_reconstructed_image, vi
ew)

    return(tour_W)

end
```

```
display("reconstruct_img.jl",22,59)
```

La fonction va créer un tour, reconstruire un image et l'enregister dans le sous-dossier "tour_and_reconstructed_image"

```
# 1 = Prim Algo,  2 = Kruskal
MST_Algorithm = [1,2]

#    if method ==1 ==> t = t/2^(period-1)
#    if method == 2 ==> k = max(1.0,k); t = t/k
#    if method == 3 ==> k = max(1.0,k); t = t/sqrt(k)
#    if method == 4 ==> t = 1.0
step_method = [1,2,3,4]

nb_iteration = [10,20]
weight_dict = Dict()
all_files = ["abstract-light-painting","alaska-railroad","blue-hour-paris",
              "lower-kananaskis-lake","marlet2-radio-board","nikos-cat","pizza-food-wallpaper",
              "the-enchanted-garden","tokyo-skytree-aerial"]

for filename_bps in all_files
  weight_dict[filename_bps] = Dict()
  for mst_method in MST_Algorithm
    for step_mt in step_method
      for nb_iter in nb_iteration
        println("Name of the instance = ", filename_bps)
        println(" Performing search grid with parameters step method = ", step_mt, " and nb of i
terations = ", nb_iter)
        weight_dict[filename_bps][(step_mt, nb_iter,mst_method)] =  reconstruct_image(filename_b
ps,false, mst_method, step_mt, nb_iter)
      end
```

```
display(joinpath(normpath(joinpath(@__FILE__,".."))*"best_parameters_search.jl"),22
,45)
```

Voici notre fonction de recherche des meilleurs paramètres. Elle va test tester la fonction principale sur chaque instance en modifiant l'algorithme MST, la méthode de pas et le nombre d'itérations.

```
path_to_original_and_constructed (generic function with 1 method)
```

Example abstract-light-painting

The best combination for instance abstract-light-painting

Step method number = 2 and number of iterations = 10

MST_Algo = 2

Total weight of best tour is 1.2310679e7

```
1.2310679e7
```

```
reconstruct_image("abstract-light-painting",false, 2, 2, 10)
```

```
("C:\\Users\\lppro\\OneDrive\\Documents\\Poly\\Cours\\MTH6412B\\code\\project\\mth6412b-s
```

```
(original_image_alp,reconstructed_image_alp)=path_to_original_and_constructed("abst
ract-light-painting")
```

Originale (gauche) vs reconstruite (droite)

```
[load(original_image_alp) load(reconstructed_image_alp)]
```

Example alaska-railroad

The best combination for instance alaska-railroad

Step method number = 2 and number of iterations = 10

MST_Algo = 2

Total weight of best tour is 7.663826e6

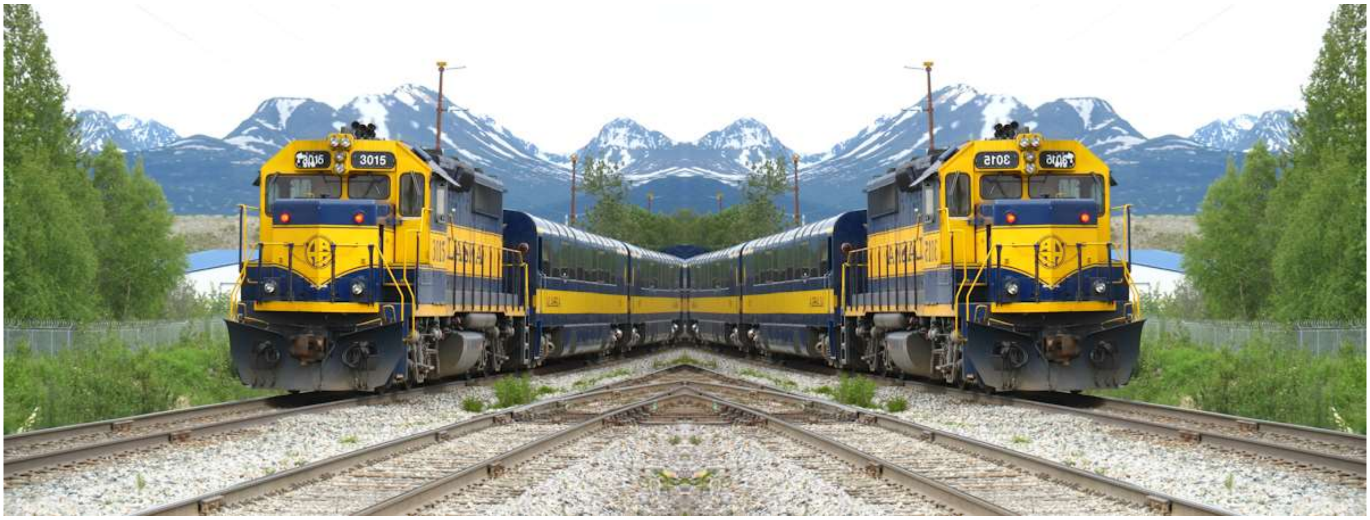
```
7.663826e6
```

```
reconstruct_image("alaska-railroad",false, 2, 2, 10)
```

```
("C:\\Users\\lppro\\OneDrive\\Documents\\Poly\\Cours\\MTH6412B\\code\\project\\mth6412b-s
```

```
(original_image_ar,reconstructed_image_ar)=path_to_original_and_constructed("alaska
-railroad")
```

Originale (gauche) vs reconstruite (droite)



```
[load(original_image_ar) load(reconstructed_image_ar)]
```

Example blue-hour-paris

The best combination for instance blue-hour-paris

Step method number = 1 and number of iterations = 20

MST_Algo = 1

Total weight of best tour is 3.941921e6

```
3.942935e6
```

```
reconstruct_image("blue-hour-paris",false, 1, 1, 20)
```

```
("C:\\Users\\lppro\\OneDrive\\Documents\\Poly\\Cours\\MTH6412B\\code\\project\\mth6412b-s
```

Originale (gauche) vs reconstruite (droite)

```
[load(original_image_bhp) load(reconstructed_image_bhp)]
```

Example lower-kananaskis-lake

```
md"### Example lower-kananaskis-lake"
```

The best combination for instance lower-kananaskis-lake

Step method number = 2 and number of iterations = 10

MST_Algo = 2

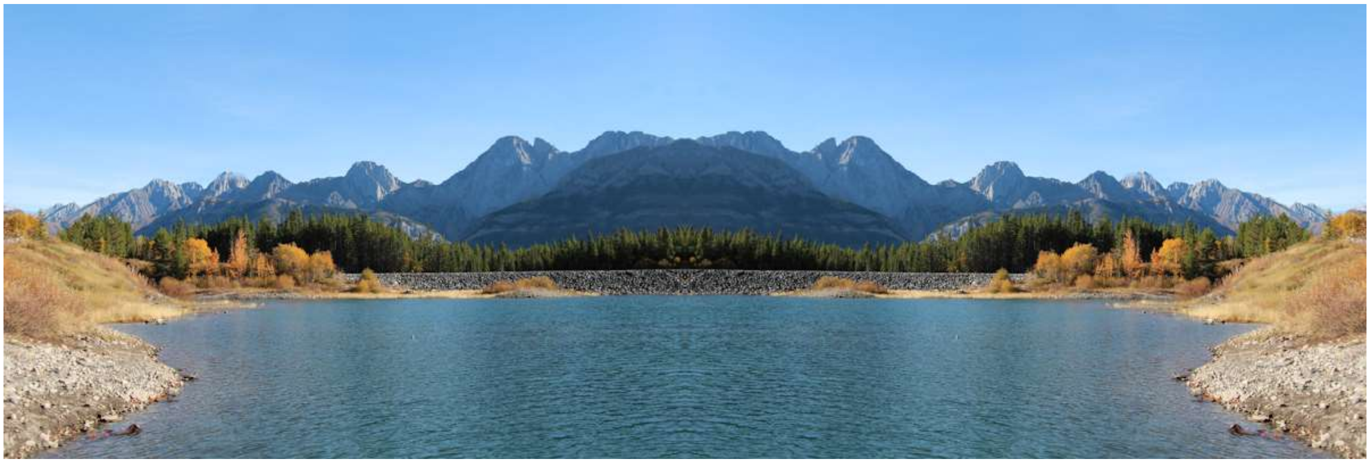
Total weight of best tour is 4.222666e6

```
4.222666e6
```

```
reconstruct_image("lower-kananaskis-lake",false, 2, 2, 10)
```

```
("C:\\Users\\lppro\\OneDrive\\Documents\\Poly\\Cours\\MTH6412B\\code\\project\\mth6412b-s
```

Originale (gauche) vs reconstruite (droite)



Example marlet2-radio-board

The best combination for instance marlet2-radio-board

Step method number = 4 and number of iterations = 20

MST_Algo = 1

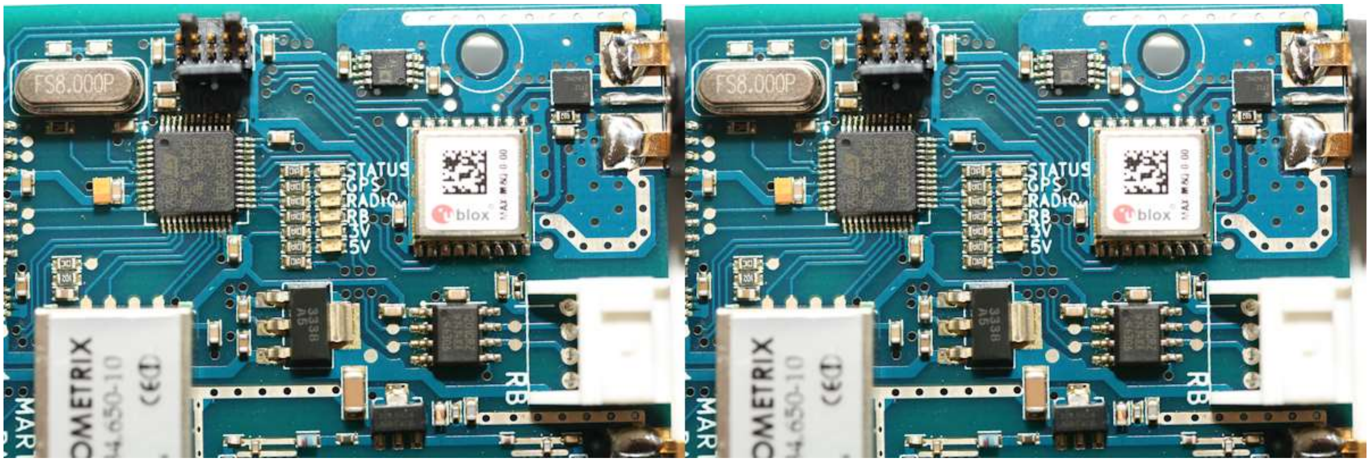
Total weight of best tour is 8.823499e6

```
8.823499e6
```

```
reconstruct_image("marlet2-radio-board",false, 1, 4, 20)
```

```
("C:\\Users\\lppro\\OneDrive\\Documents\\Poly\\Cours\\MTH6412B\\code\\project\\mth6412b-s
```

Originale (gauche) vs reconstruite (droite)



```
[load(original_image_mrb) load(reconstructed_image_mrb)]
```

Example nikos-cat

The best combination for instance nikos-cat

Step method number = 4 and number of iterations = 20

MST_Algo = 1

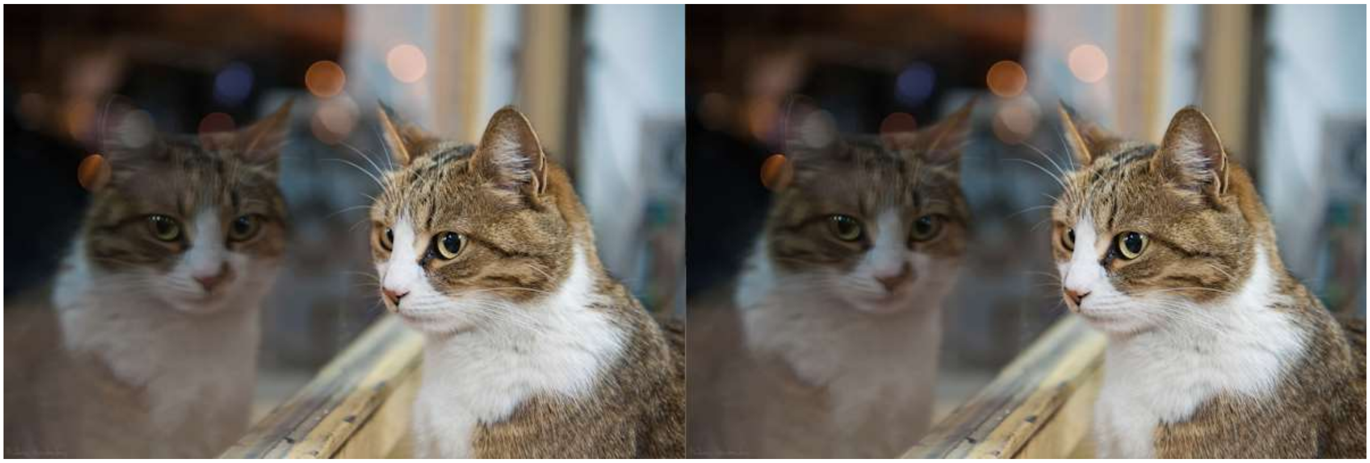
Total weight of best tour is 3.035828e6

```
3.036227e6
```

```
reconstruct_image("nikos-cat",false, 1, 4, 20)
```

```
("C:\\Users\\lppro\\OneDrive\\Documents\\Poly\\Cours\\MTH6412B\\code\\project\\mth6412b-s
```

Originale (gauche) vs reconstruite (droite)



```
[load(original_image_nc) load(reconstructed_image_nc)]
```

Example pizza-food-wallpaper

The best combination for instance pizza-food-wallpaper

Step method number = 2 and number of iterations = 10

MST_Algo = 2

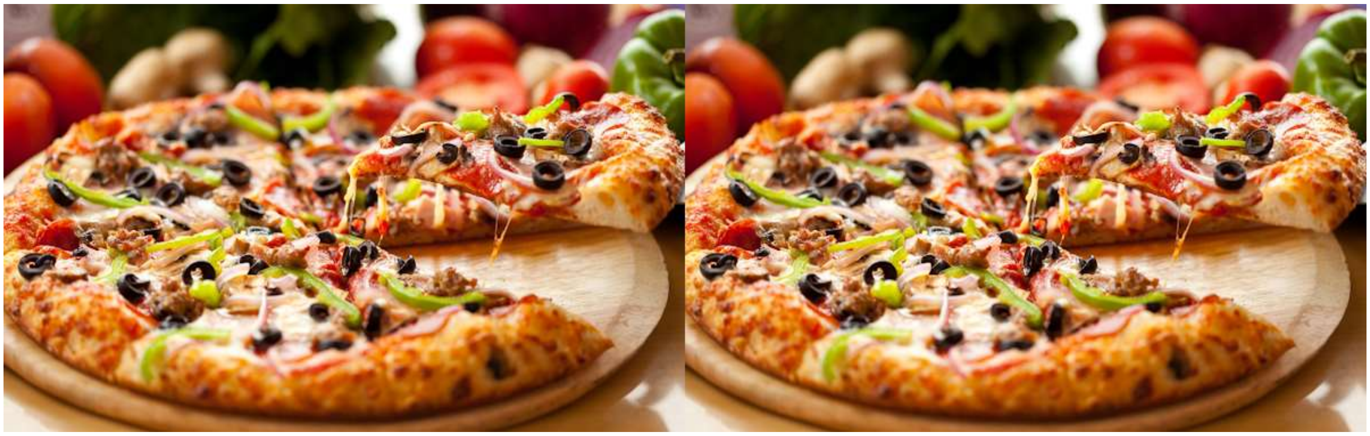
Total weight of best tour is 5.037248e6

```
5.037248e6
```

```
reconstruct_image("pizza-food-wallpaper",false, 2, 2, 10)
```

```
("C:\\Users\\lppro\\OneDrive\\Documents\\Poly\\Cours\\MTH6412B\\code\\project\\mth6412b-s
```

Originale (gauche) vs reconstruite (droite)



```
[load(original_image_pfw) load(reconstructed_image_pfw)]
```

Example the-enchanted-garden

The best combination for instance the-enchanted-garden

Step method number = 2 and number of iterations = 10

MST_Algo = 2

Total weight of best tour is 1.9910312e7

```
1.9910312e7
```

```
reconstruct_image("the-enchanted-garden",false, 2, 2, 10)
```

```
("C:\\Users\\lppro\\OneDrive\\Documents\\Poly\\Cours\\MTH6412B\\code\\project\\mth6412b-s
```

Originale (gauche) vs reconstruite (droite)

```
[load(original_image_teg) load(reconstructed_image_teg)]
```

Example tokyo-skytree-aerial

The best combination for instance tokyo-skytree-aerial

Step method number = 2 and number of iterations = 10

MST_Algo = 2

Total weight of best tour is 1.360595e7

```
1.360595e7
```

```
reconstruct_image("tokyo-skytree-aerial",false, 2, 2, 10)
```

```
("C:\\Users\\lppro\\OneDrive\\Documents\\Poly\\Cours\\MTH6412B\\code\\project\\mth6412b-s
```

Originale (gauche) vs reconstruite (droite)

```
[load(original_image_tsa) load(reconstructed_image_tsa)]
```