```
C:\Users\vince\anaconda3\python.exe "D:/Documents/Choses école/UQAC/Session7/8INF436-Forage_de_donnees/TP3/main.py"
2021-04-07 09:46:20.448126: W tensorflow/stream_executor/platform/default/dso_loader.cc:60] Could not load dynamic library 'cudart64_110.dll'; dlerror: cudart64_110.dll not found
2021-04-07 09:46:20.448350: I tensorflow/stream_executor/cuda/cudart_stub.cc:29] Ignore above cudart dlerror if you do not have a GPU set up on your machine.
Missing values per attribute:
 id                  0
gender               0
age                  0
hypertension         0
heart_disease        0
ever_married         0
work_type            0
Residence_type       0
avg_glucose_level    0
bmi                  0
smoking_status       0
stroke               0
dtype: int64
C:\Users\vince\anaconda3\lib\site-packages\pandas\core\indexing.py:1736: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
```

```
  isetter(loc, value[:, i].tolist())
<class 'pandas.core.frame.DataFrame'>
Int64Index: 4860 entries, 0 to 5109
Data columns (total 10 columns):
 #   Column             Non-Null Count  Dtype
---  ------             --------------  -----
 0   gender             4860 non-null   float64
 1   age                4860 non-null   float64
 2   hypertension       4860 non-null   float64
 3   heart_disease      4860 non-null   float64
 4   ever_married       4860 non-null   float64
 5   work_type          4860 non-null   float64
 6   Residence_type     4860 non-null   float64
 7   avg_glucose_level  4860 non-null   float64
 8   bmi                4860 non-null   float64
 9   smoking_status     4860 non-null   float64
dtypes: float64(10)
memory usage: 417.7 KB
None

Auto-encodeurs linéaires trop complets à 2 couches avec sparsity
La couche 1 possède 11 unités
2021-04-07 09:46:22.303868: I tensorflow/compiler/jit/xla_cpu_device.cc:41] Not creating XLA devices,
```

```
45 tf_xla_enable_xla_devices not set
46 2021-04-07 09:46:22.304311: I tensorflow/
   stream_executor/platform/default/dso_loader.
   cc:49] Successfully opened dynamic library
   nvcuda.dll
47 2021-04-07 09:46:22.328351: I tensorflow/core
   /common_runtime/gpu/gpu_device.cc:1720] Found
    device 0 with properties:
48 pciBusID: 0000:08:00.0 name: GeForce RTX 2080
    computeCapability: 7.5
49 coreClock: 1.71GHz coreCount: 46
   deviceMemorySize: 8.00GiB
   deviceMemoryBandwidth: 417.23GiB/s
50 2021-04-07 09:46:22.329275: W tensorflow/
   stream_executor/platform/default/dso_loader.
   cc:60] Could not load dynamic library '
   cudart64_110.dll'; dlerror: cudart64_110.dll
   not found
51 2021-04-07 09:46:22.330137: W tensorflow/
   stream_executor/platform/default/dso_loader.
   cc:60] Could not load dynamic library '
   cublas64_11.dll'; dlerror: cublas64_11.dll
   not found
52 2021-04-07 09:46:22.330994: W tensorflow/
   stream_executor/platform/default/dso_loader.
   cc:60] Could not load dynamic library '
   cublasLt64_11.dll'; dlerror: cublasLt64_11.
   dll not found
53 2021-04-07 09:46:22.331886: W tensorflow/
   stream_executor/platform/default/dso_loader.
   cc:60] Could not load dynamic library '
   cufft64_10.dll'; dlerror: cufft64_10.dll not
   found
54 2021-04-07 09:46:22.332504: W tensorflow/
   stream_executor/platform/default/dso_loader.
   cc:60] Could not load dynamic library '
   curand64_10.dll'; dlerror: curand64_10.dll
   not found
```

```
55 2021-04-07 09:46:22.333036: W tensorflow/
   stream_executor/platform/default/dso_loader.
   cc:60] Could not load dynamic library '
   cusolver64_10.dll'; dlerror: cusolver64_10.
   dll not found
56 2021-04-07 09:46:22.333557: W tensorflow/
   stream_executor/platform/default/dso_loader.
   cc:60] Could not load dynamic library '
   cusparse64_11.dll'; dlerror: cusparse64_11.
   dll not found
57 2021-04-07 09:46:22.334079: W tensorflow/
   stream_executor/platform/default/dso_loader.
   cc:60] Could not load dynamic library '
   cudnn64_8.dll'; dlerror: cudnn64_8.dll not
   found
58 2021-04-07 09:46:22.334166: W tensorflow/core
   /common_runtime/gpu/gpu_device.cc:1757]
   Cannot dlopen some GPU libraries. Please make
    sure the missing libraries mentioned above
   are installed properly if you would like to
   use GPU. Follow the guide at https://www.
   tensorflow.org/install/gpu for how to
   download and setup the required libraries for
    your platform.
59 Skipping registering GPU devices...
60 2021-04-07 09:46:22.334719: I tensorflow/core
   /platform/cpu_feature_guard.cc:142] This
   TensorFlow binary is optimized with oneAPI
   Deep Neural Network Library (oneDNN) to use
   the following CPU instructions in performance
   -critical operations:  AVX2
61 To enable them in other operations, rebuild
   TensorFlow with the appropriate compiler
   flags.
62 2021-04-07 09:46:22.335390: I tensorflow/core
   /common_runtime/gpu/gpu_device.cc:1261]
   Device interconnect StreamExecutor with
   strength 1 edge matrix:
```

```
2021-04-07 09:46:22.335488: I tensorflow/core/common_runtime/gpu/gpu_device.cc:1267]
2021-04-07 09:46:22.335539: I tensorflow/compiler/jit/xla_gpu_device.cc:99] Not creating XLA devices, tf_xla_enable_xla_devices not set
2021-04-07 09:46:22.397559: I tensorflow/compiler/mlir/mlir_graph_optimization_pass.cc:116] None of the MLIR optimization passes are enabled (registered 2)
31/31 [==============================] - 0s 300us/step
31/31 [==============================] - 0s 300us/step
31/31 [==============================] - 0s 300us/step
31/31 [==============================] - 0s 367us/step
31/31 [==============================] - 0s 300us/step
31/31 [==============================] - 0s 267us/step
31/31 [==============================] - 0s 300us/step
31/31 [==============================] - 0s 300us/step
31/31 [==============================] - 0s 300us/step
31/31 [==============================] - 0s 367us/step
La couche 1 possède 12 unités
31/31 [==============================] - 0s 300us/step
31/31 [==============================] - 0s 367us/step
31/31 [==============================] - 0s 300us/step
```

```
80 31/31 [==============================] - 0s
   300us/step
81 31/31 [==============================] - 0s
   300us/step
82 31/31 [==============================] - 0s
   333us/step
83 31/31 [==============================] - 0s
   333us/step
84 31/31 [==============================] - 0s
   333us/step
85 31/31 [==============================] - 0s
   333us/step
86 31/31 [==============================] - 0s
   300us/step
87 La couche 1 possède 13 unités
88 31/31 [==============================] - 0s
   367us/step
89 31/31 [==============================] - 0s
   333us/step
90 31/31 [==============================] - 0s
   367us/step
91 31/31 [==============================] - 0s
   367us/step
92 31/31 [==============================] - 0s
   700us/step
93 31/31 [==============================] - 0s
   400us/step
94 31/31 [==============================] - 0s
   433us/step
95 31/31 [==============================] - 0s
   333us/step
96 31/31 [==============================] - 0s
   367us/step
97 31/31 [==============================] - 0s
   367us/step
98 La couche 1 possède 14 unités
99 31/31 [==============================] - 0s
   333us/step
```

```
100 31/31 [==============================] - 0s
    400us/step
101 31/31 [==============================] - 0s
    333us/step
102 31/31 [==============================] - 0s
    333us/step
103 31/31 [==============================] - 0s
    333us/step
104 31/31 [==============================] - 0s
    433us/step
105 31/31 [==============================] - 0s
    367us/step
106 31/31 [==============================] - 0s
    367us/step
107 31/31 [==============================] - 0s
    400us/step
108 31/31 [==============================] - 0s
    400us/step
109 La couche 1 possède 15 unités
110 31/31 [==============================] - 0s
    367us/step
111 31/31 [==============================] - 0s
    400us/step
112 31/31 [==============================] - 0s
    367us/step
113 31/31 [==============================] - 0s
    400us/step
114 31/31 [==============================] - 0s
    400us/step
115 31/31 [==============================] - 0s
    333us/step
116 31/31 [==============================] - 0s
    333us/step
117 31/31 [==============================] - 0s
    333us/step
118 31/31 [==============================] - 0s
    333us/step
119 31/31 [==============================] - 0s
```

```
119 333us/step
120 La couche 1 possède 16 unités
121 31/31 [==============================] - 0s
    333us/step
122 31/31 [==============================] - 0s
    367us/step
123 31/31 [==============================] - 0s
    400us/step
124 31/31 [==============================] - 0s
    400us/step
125 31/31 [==============================] - 0s
    367us/step
126 31/31 [==============================] - 0s
    333us/step
127 31/31 [==============================] - 0s
    367us/step
128 31/31 [==============================] - 0s
    400us/step
129 31/31 [==============================] - 0s
    333us/step
130 31/31 [==============================] - 0s
    300us/step
131 La couche 1 possède 17 unités
132 31/31 [==============================] - 0s
    300us/step
133 31/31 [==============================] - 0s
    333us/step
134 31/31 [==============================] - 0s
    333us/step
135 31/31 [==============================] - 0s
    367us/step
136 31/31 [==============================] - 0s
    367us/step
137 31/31 [==============================] - 0s
    400us/step
138 31/31 [==============================] - 0s
    400us/step
139 31/31 [==============================] - 0s
```

```
139 367us/step
140 31/31 [==============================] - 0s
    367us/step
141 31/31 [==============================] - 0s
    333us/step
142 La couche 1 possède 18 unités
143 31/31 [==============================] - 0s
    300us/step
144 31/31 [==============================] - 0s
    300us/step
145 31/31 [==============================] - 0s
    300us/step
146 31/31 [==============================] - 0s
    333us/step
147 31/31 [==============================] - 0s
    400us/step
148 31/31 [==============================] - 0s
    367us/step
149 31/31 [==============================] - 0s
    367us/step
150 31/31 [==============================] - 0s
    367us/step
151 31/31 [==============================] - 0s
    367us/step
152 31/31 [==============================] - 0s
    333us/step
153 La couche 1 possède 19 unités
154 31/31 [==============================] - 0s
    400us/step
155 31/31 [==============================] - 0s
    400us/step
156 31/31 [==============================] - 0s
    367us/step
157 31/31 [==============================] - 0s
    367us/step
158 31/31 [==============================] - 0s
    333us/step
159 31/31 [==============================] - 0s
```

```
159 367us/step
160 31/31 [==============================] - 0s
    333us/step
161 31/31 [==============================] - 0s
    333us/step
162 31/31 [==============================] - 0s
    400us/step
163 31/31 [==============================] - 0s
    400us/step
164 La couche 1 possède 20 unités
165 31/31 [==============================] - 0s
    400us/step
166 31/31 [==============================] - 0s
    433us/step
167 31/31 [==============================] - 0s
    400us/step
168 31/31 [==============================] - 0s
    367us/step
169 31/31 [==============================] - 0s
    400us/step
170 31/31 [==============================] - 0s
    333us/step
171 31/31 [==============================] - 0s
    386us/step
172 31/31 [==============================] - 0s
    367us/step
173 31/31 [==============================] - 0s
    300us/step
174 31/31 [==============================] - 0s
    333us/step
175 La couche 1 possède 21 unités
176 31/31 [==============================] - 0s
    367us/step
177 31/31 [==============================] - 0s
    400us/step
178 31/31 [==============================] - 0s
    333us/step
179 31/31 [==============================] - 0s
```

```
179 367us/step
180 31/31 [==============================] - 0s
    367us/step
181 31/31 [==============================] - 0s
    400us/step
182 31/31 [==============================] - 0s
    333us/step
183 31/31 [==============================] - 0s
    367us/step
184 31/31 [==============================] - 0s
    367us/step
185 31/31 [==============================] - 0s
    400us/step
186 La couche 1 possède 22 unités
187 31/31 [==============================] - 0s
    367us/step
188 31/31 [==============================] - 0s
    400us/step
189 31/31 [==============================] - 0s
    400us/step
190 31/31 [==============================] - 0s
    367us/step
191 31/31 [==============================] - 0s
    333us/step
192 31/31 [==============================] - 0s
    300us/step
193 31/31 [==============================] - 0s
    433us/step
194 31/31 [==============================] - 0s
    333us/step
195 31/31 [==============================] - 0s
    367us/step
196 31/31 [==============================] - 0s
    333us/step
197 La couche 1 possède 23 unités
198 31/31 [==============================] - 0s
    367us/step
199 31/31 [==============================] - 0s
```

```
199 333us/step
200 31/31 [==============================] - 0s
    333us/step
201 31/31 [==============================] - 0s
    367us/step
202 31/31 [==============================] - 0s
    367us/step
203 31/31 [==============================] - 0s
    367us/step
204 31/31 [==============================] - 0s
    333us/step
205 31/31 [==============================] - 0s
    333us/step
206 31/31 [==============================] - 0s
    333us/step
207 31/31 [==============================] - 0s
    367us/step
208 La couche 1 possède 24 unités
209 31/31 [==============================] - 0s
    367us/step
210 31/31 [==============================] - 0s
    367us/step
211 31/31 [==============================] - 0s
    367us/step
212 31/31 [==============================] - 0s
    367us/step
213 31/31 [==============================] - 0s
    367us/step
214 31/31 [==============================] - 0s
    433us/step
215 31/31 [==============================] - 0s
    367us/step
216 31/31 [==============================] - 0s
    367us/step
217 31/31 [==============================] - 0s
    333us/step
218 31/31 [==============================] - 0s
    333us/step
```

```
Scores moyens(précision moyenne et écart-type) pour les auto-encodeurs linéaires trop complets à 2 couches avec sparsity:
{11: (0.13520572712257609, 0.2478), 12: (0.10996164530632391, 0.3267), 13: (0.12445123667081423, 0.203), 14: (0.12553982169333533, 0.2166), 15: (0.13489702620773242, 0.2052), 16: (0.130178672918864, 0.1164), 17: (0.13516383272939514, 0.2322), 18: (0.12187852494096503, 0.2014), 19: (0.126208962335314 67, 0.1789), 20: (0.1307522200660 2125, 0.1238), 21: (0.12699260768280246, 0.0874), 22: (0.12582993875315773, 0.1518), 23: (0.13462746296637235, 0.2323), 24: (0.11718470188728194, 0.1382)}

Process finished with exit code 0
```