

# **Report 1 - MIGMA STATS**

**Data:** 12/05/2022

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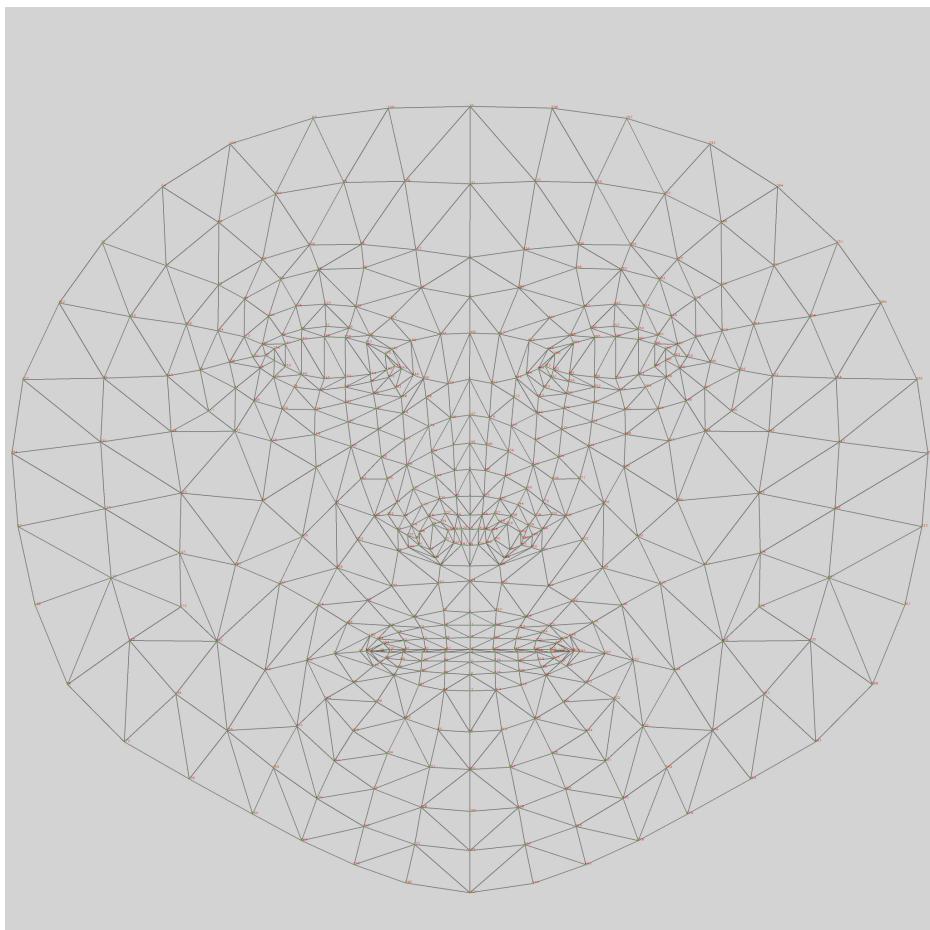
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## 1 - Obtenção dos dados

### 1.1 - Distâncias

Os dados que serão analisados foram coletados tirando a distância, em pixels, entre o ponto A de uma expressão facial qualquer e o mesmo ponto A na expressão neutra não supervisionada da mesma pessoa.

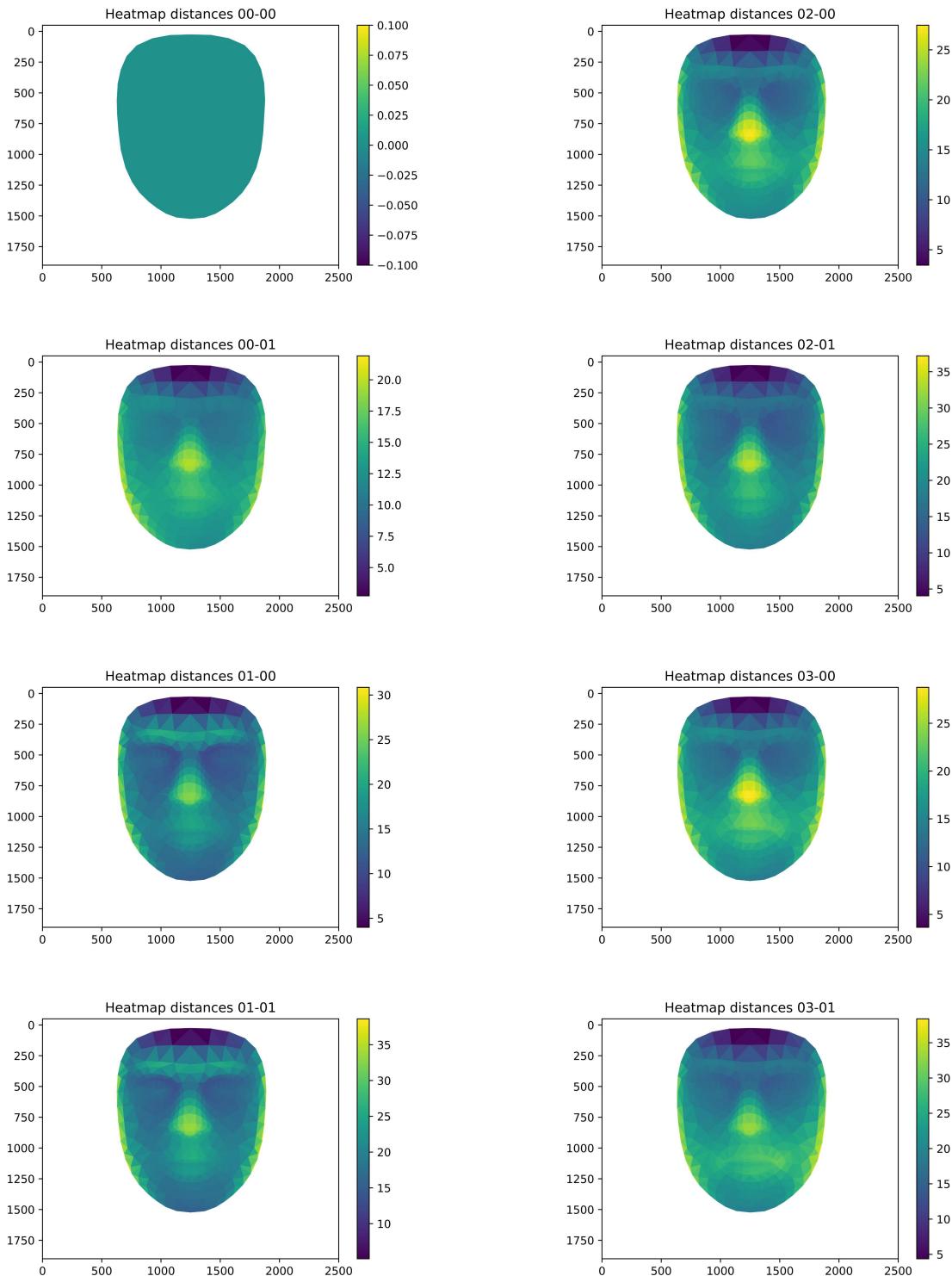
Os 468 pontos sendo analisados são os seguintes:

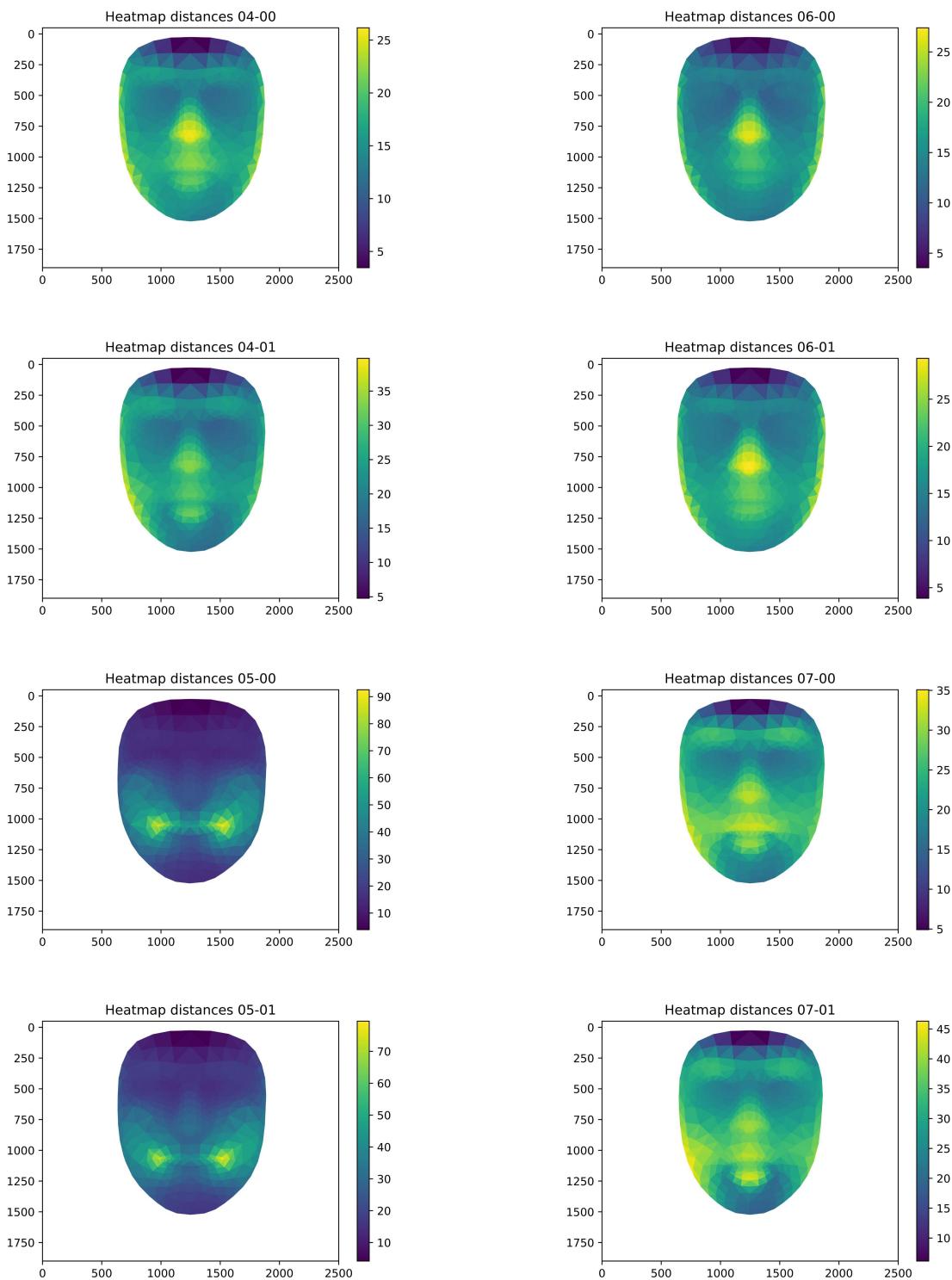


[Imagen Original](#)

### 1.2 - Visualização

Com os dados colhidos no teste anterior, os seguintes heatmaps com as distâncias médias para cada máscara foram gerados para auxiliar na compreensão visual dos dados:

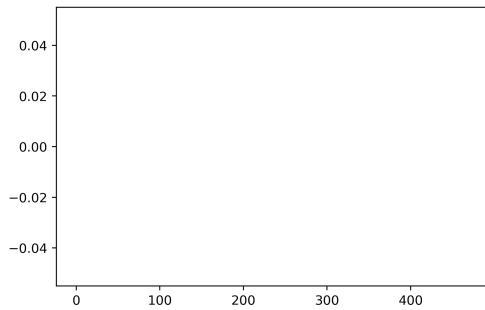




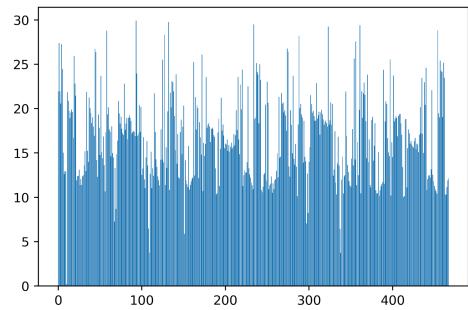
### 1.3 - Pontos Faciais Relevantes

Desta forma, buscou-se saber quais são os pontos que, em todas as máscaras, possuem variação superior à média. Neste caso, também foram gerados gráficos para auxiliar a visualização:

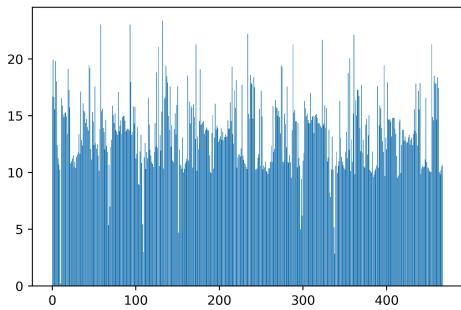
Average values of distance to neutral face of 00-00



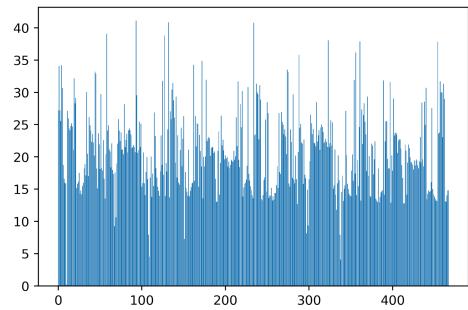
Average values of distance to neutral face of 02-00



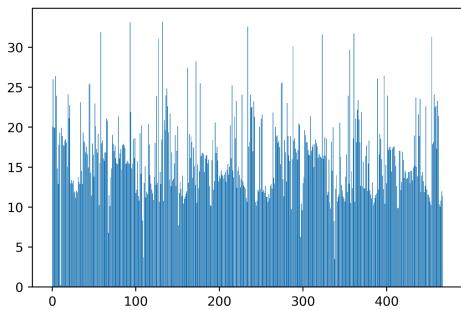
Average values of distance to neutral face of 00-01



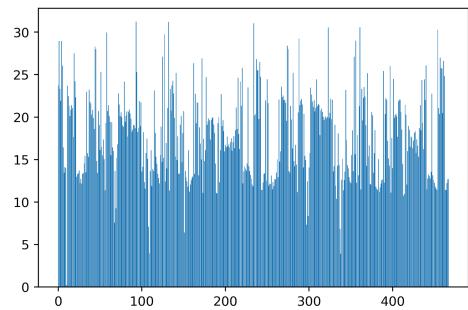
Average values of distance to neutral face of 02-01



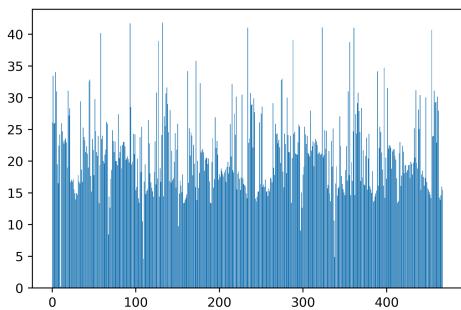
Average values of distance to neutral face of 01-00



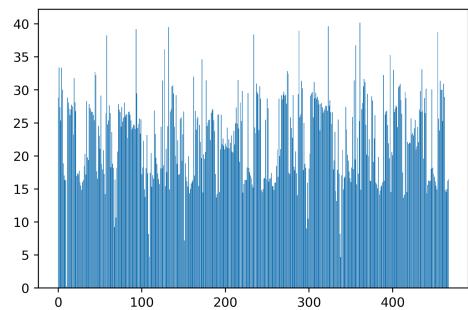
Average values of distance to neutral face of 03-00



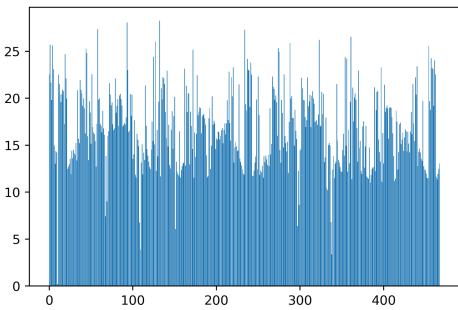
Average values of distance to neutral face of 01-01



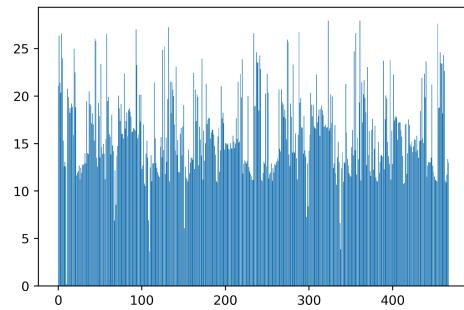
Average values of distance to neutral face of 03-01



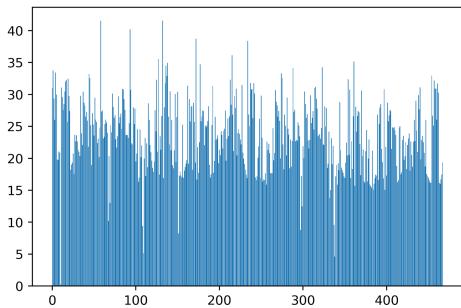
Average values of distance to neutral face of 04-00



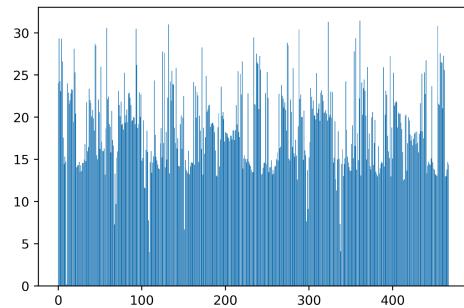
Average values of distance to neutral face of 06-00



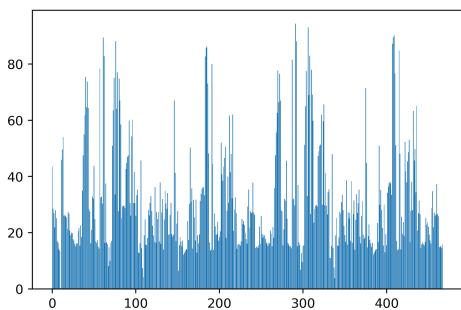
Average values of distance to neutral face of 04-01



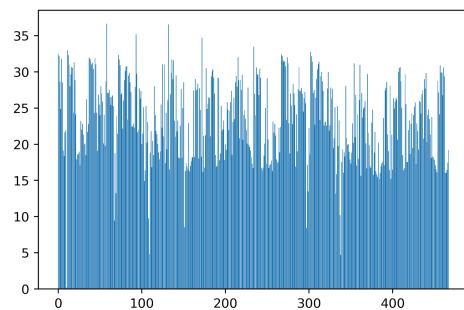
Average values of distance to neutral face of 06-01



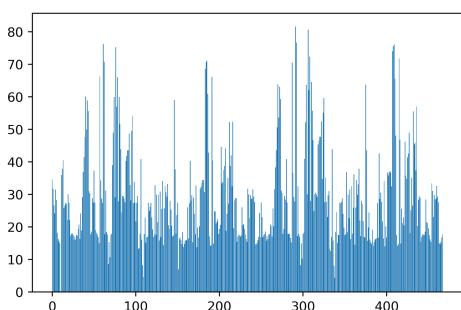
Average values of distance to neutral face of 05-00



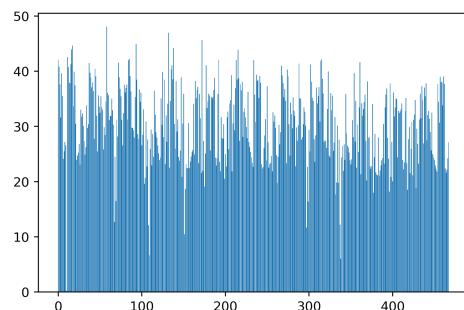
Average values of distance to neutral face of 07-00



Average values of distance to neutral face of 05-01



Average values of distance to neutral face of 07-01

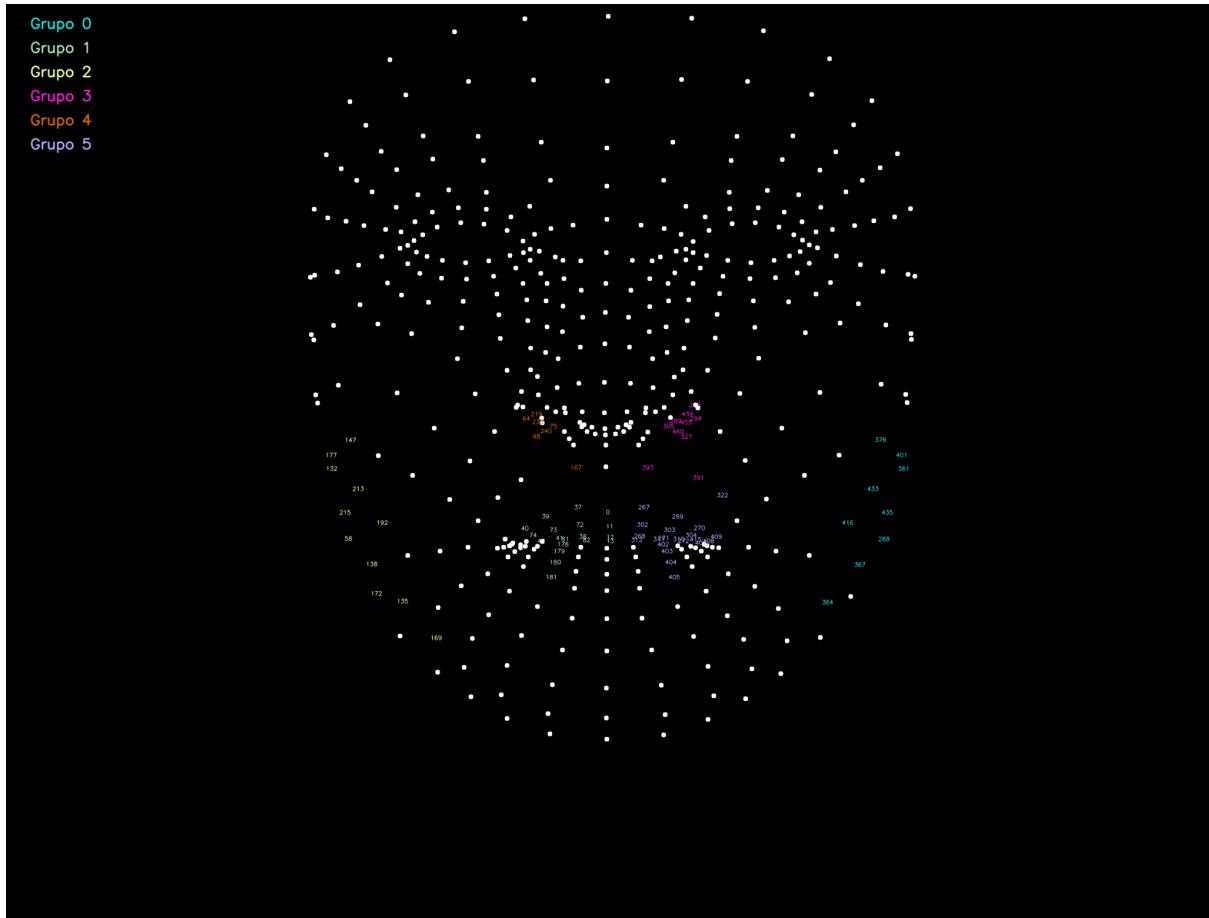


Com isso chegou-se à conclusão que os seguintes 77 pontos são os mais relevantes para serem analisados mais profundamente:

0,11,12,13,37,38,39,40,41,42,58,64,72,73,74,75,81,82,98,132,135,138,147,167,169,172,177,178,179,180,181,192,213,215,219,235,240,267,268,269,270,271,272,278,288,289,294,302,303,304,305,310,311,312,322,327,361,364,367,376,391,393,401,402,403,404,405,407,408,409,415,416,433,435,439,455,460

## 2 - Agrupamento por K-Means

Agora, com a lista de pontos acima da média em mãos, foi decidido por utilizar uma técnica de clusterização conhecida como k-means para separar estes pontos faciais em 6 grupos. O resultado é o que segue:



Os testes descritos na próxima seção foram conduzidos utilizando a média das distâncias de cada grupo para cada máscara

### 3 - Testes de Pearson

#### 3.1 - Resultados Interessantes de P-Valor<0.005

Quanto menor o p-valor, mais confiança temos que a correlação não foi aleatória, por isso foi escolhido 0.005 como limite superior para esta métrica nesta análise. Aqui seguem alguns resultados curiosos que serão dissecados mais a fundo posteriormente:

col_a	col_b	pvalue
01-00_0	age	0.0001526951461456
01-01_0	age	0.000165202215876
01-01_2	age	3.007638738624307e-05
asrsa_score	age	0.0010144241870996
sqr_score	age	0.0010860537059865
age	age	0.0
dbi_score	asrsa_score	1.85413218500275e-20
bai_score	asrsa_score	1.2439537894740144e-11
asrsa_score	asrsa_score	0.0
05-00_0	asrsb_score	0.0005039778854058
05-00_1	asrsb_score	0.0005968588103809
05-00_2	asrsb_score	6.888895152022905e-05
05-00_3	asrsb_score	0.0026455506905542
05-00_4	asrsb_score	0.0030785229313299
05-00_5	asrsb_score	0.0001555247981378
05-01_2	asrsb_score	0.0007075887126081
dbi_score	asrsb_score	4.38291988053874e-14
bai_score	asrsb_score	2.0534421568761944e-19
asrsa_score	asrsb_score	8.201609985877079e-20
asrsb_score	asrsb_score	0.0
01-00_0	bai_score	0.0026575275045583
05-01_2	bai_score	0.0010027727526142
dbi_score	bai_score	2.0362274428695308e-43
bai_score	bai_score	0.0
05-00_5	dbi_score	0.0045240092391752
dbi_score	dbi_score	0.0
05-00_3	oci_score	0.0023595920725358
dbi_score	oci_score	7.318469090859452e-26
bai_score	oci_score	2.102374116748585e-28
asrsa_score	oci_score	8.730658676356313e-07

asrsb_score	oci_score	2.1513862064522123e-14
oci_score	oci_score	0.0
05-01_2	sqr_score	0.0043378892933926
dbi_score	sqr_score	1.3974726920258273e-51
bai_score	sqr_score	1.3062220489398262e-51
asrsa_score	sqr_score	2.459195382242105e-24
asrsb_score	sqr_score	2.0290000262244025e-18
oci_score	sqr_score	2.6499602033510973e-25
sqr_score	sqr_score	0.0

### 3.1 - Análise do R-Valor

O R-Valor diz respeito à força da correlação linear entre duas variáveis, se for positivo significa que um valor alto em uma geralmente corresponde ao mesmo na outra e se for negativo, o inverso.

Contudo, ao analisar os resultados desta métrica, notou-se que nenhuma correlação possui um R-Valor cujo módulo seja superior à 0.25, o que indica que as correlações encontradas não são precisas, apesar de podermos ter bastante certeza caso façamos uma estimativa educada as utilizando

col_a	col_b	rvalue
01-00_0	age	0.21378548083477228
01-00_2	age	0.1082317103283364
01-00_3	age	0.1093161759131063
01-00_5	age	0.13459169285487083
01-01_0	age	0.21270349742411915
01-01_1	age	0.12291519450015367
01-01_2	age	0.2350067699997614
01-01_3	age	0.1297197506794357
01-01_4	age	0.11337097294632598
01-01_5	age	0.14397301700649226
02-00_3	age	0.13066509149033795
02-00_4	age	0.11578386184955747
05-01_5	age	0.12705863342703075
06-00_1	age	0.11573448289567224
06-00_2	age	0.10668673914586185
06-00_3	age	0.1124796318988297
06-00_4	age	0.12039769768619722
06-00_5	age	0.11308088925801935
06-01_4	age	0.10332946675518377

dbi_score	age	-0.1307589716814954
bai_score	age	-0.15503636071043286
asrsa_score	age	-0.18608081183941844
oci_score	age	-0.13850290036513016
sqr_score	age	-0.1850089575862734
age	age	1.0
03-00_5	asrsa_score	0.1015667118462595
03-01_1	asrsa_score	0.13068652610263395
03-01_3	asrsa_score	0.10653100477240883
03-01_4	asrsa_score	0.12315148495694354
03-01_5	asrsa_score	0.12812234309546167
04-01_0	asrsa_score	-0.1253129450780163
04-01_5	asrsa_score	-0.10761439352538607
05-00_1	asrsa_score	0.10615895249139251
05-00_4	asrsa_score	0.11160513619733231
07-00_2	asrsa_score	-0.10878199004741722
dbi_score	asrsa_score	0.49447494994476093
bai_score	asrsa_score	0.37293541701693245
asrsa_score	asrsa_score	0.9999999999999998
01-00_2	asrsb_score	0.14531554078828451
03-01_2	asrsb_score	0.1067616468970629
04-01_3	asrsb_score	-0.11170723029163283
04-01_5	asrsb_score	-0.13826491719890155
05-00_0	asrsb_score	0.19675215350125175
05-00_1	asrsb_score	0.19422287726224263
05-00_2	asrsb_score	0.2244339895379587
05-00_3	asrsb_score	0.1704530348318965
05-00_4	asrsb_score	0.1678603744744901
05-00_5	asrsb_score	0.21353360908763677
05-01_2	asrsb_score	0.1916460793143306
07-01_0	asrsb_score	0.12312584432195182
07-01_2	asrsb_score	0.10801153294025145
dbi_score	asrsb_score	0.411907376169409
bai_score	asrsb_score	0.48238724867575916
asrsa_score	asrsb_score	0.48705731685828196
asrsb_score	asrsb_score	1.0
01-00_0	bai_score	-0.17037628805127455

01-00_3	bai_score	-0.11812122721305157
01-00_5	bai_score	-0.11715296617059284
01-01_0	bai_score	-0.10235113691920784
03-01_5	bai_score	0.11218800278620257
05-00_1	bai_score	0.12006933328153982
05-00_2	bai_score	0.1106971149522559
05-00_3	bai_score	0.11501790665411482
05-00_4	bai_score	0.11100323135855651
05-00_5	bai_score	0.1390821632716211
05-01_2	bai_score	0.18626171996464544
07-01_0	bai_score	0.11438661751328008
dbi_score	bai_score	0.680828993759898
bai_score	bai_score	1.0
00-01_5	dbi_score	0.10385858025911172
01-00_1	dbi_score	-0.11272739282415987
01-00_3	dbi_score	-0.14283610908800648
01-00_5	dbi_score	-0.13887360858732167
03-00_2	dbi_score	0.12921530502607206
03-00_5	dbi_score	0.10519090404060034
03-01_1	dbi_score	0.1256481314996018
03-01_3	dbi_score	0.15298128700607883
03-01_4	dbi_score	0.12502186199977344
03-01_5	dbi_score	0.14917881233455485
05-00_0	dbi_score	0.13501360295318046
05-00_1	dbi_score	0.14861114195216157
05-00_2	dbi_score	0.13488631852390254
05-00_3	dbi_score	0.15367832986120464
05-00_4	dbi_score	0.1389191775156366
05-00_5	dbi_score	0.1611076916130174
05-01_2	dbi_score	0.1383666324709102
dbi_score	dbi_score	1.0
05-00_0	oci_score	0.15403249558958007
05-00_1	oci_score	0.12831334129393043
05-00_2	oci_score	0.1497731864344825
05-00_3	oci_score	0.17238627604541895
05-00_4	oci_score	0.13227262183892988
05-00_5	oci_score	0.15665371997784136

05-01_1	oci_score	0.11108875744992107
05-01_2	oci_score	0.1516290008332504
05-01_5	oci_score	0.11662174742219392
07-01_2	oci_score	0.10210936354950188
dbi_score	oci_score	0.5503216939092286
bai_score	oci_score	0.5733741390040541
asrsa_score	oci_score	0.27547570448619113
asrsb_score	oci_score	0.41647423279535084
oci_score	oci_score	1.0
00-01_4	sqr_score	0.1067128744930875
01-00_0	sqr_score	-0.1128854058785221
01-00_3	sqr_score	-0.10572095215217413
01-00_5	sqr_score	-0.1099775535752842
03-01_1	sqr_score	0.1245504202686586
03-01_3	sqr_score	0.10977471404977407
03-01_5	sqr_score	0.11995749763547649
04-00_1	sqr_score	-0.1374273067435902
04-00_3	sqr_score	-0.13032506958504464
04-00_4	sqr_score	-0.10828634484774957
04-00_5	sqr_score	-0.1488079604489652
05-00_1	sqr_score	0.13135692146237943
05-00_2	sqr_score	0.11966358330141276
05-00_4	sqr_score	0.12028207078111479
05-01_2	sqr_score	0.16185685666941454
dbi_score	sqr_score	0.7246854936314172
bai_score	sqr_score	0.7248291499986641
asrsa_score	sqr_score	0.5355663123248429
asrsb_score	sqr_score	0.47041003092662215
oci_score	sqr_score	0.5450037215096415
sqr_score	sqr_score	0.9999999999999998