AutoEncoder UIMatch

(Reconhecimento de similaridade em interfaces de aplicativo)

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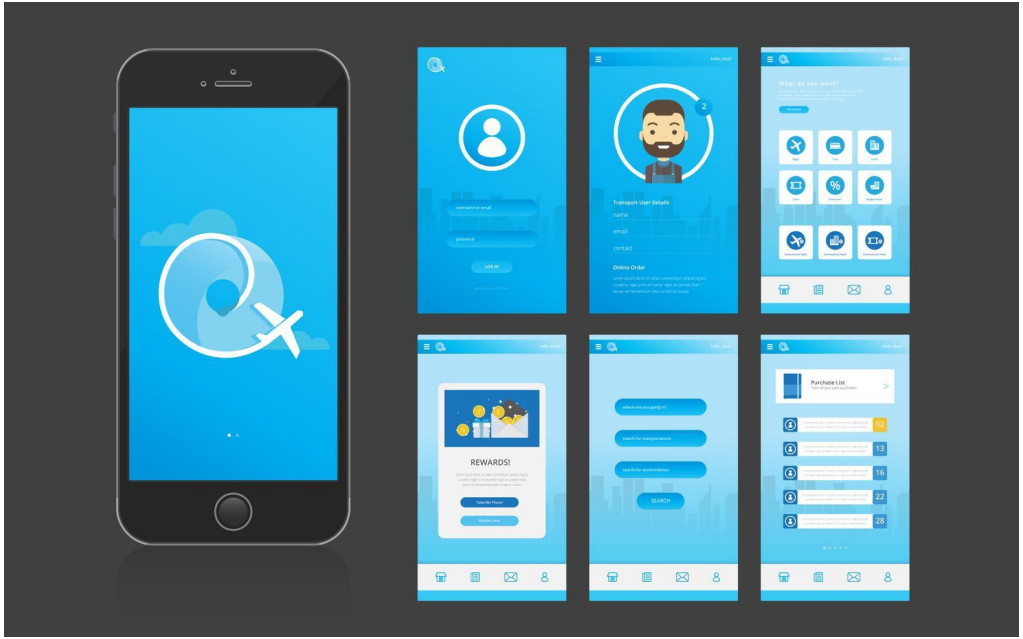
Sobre o problema

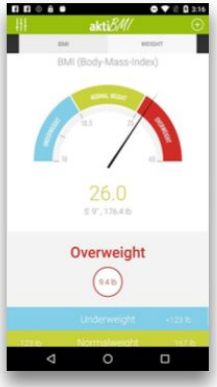
A ideia central do trabalho é encontrar interfaces de aplicativo que são semelhantes, e, dessa forma, verificar a originalidade da sua interface.

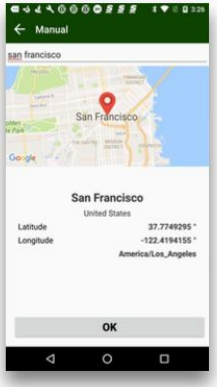


Fonte: https://pt.vecteezy.com/arte-vetorial/184428-interface-da-interface-do-usuario-do-aplicativo-movel-e-gui

Base de Dados

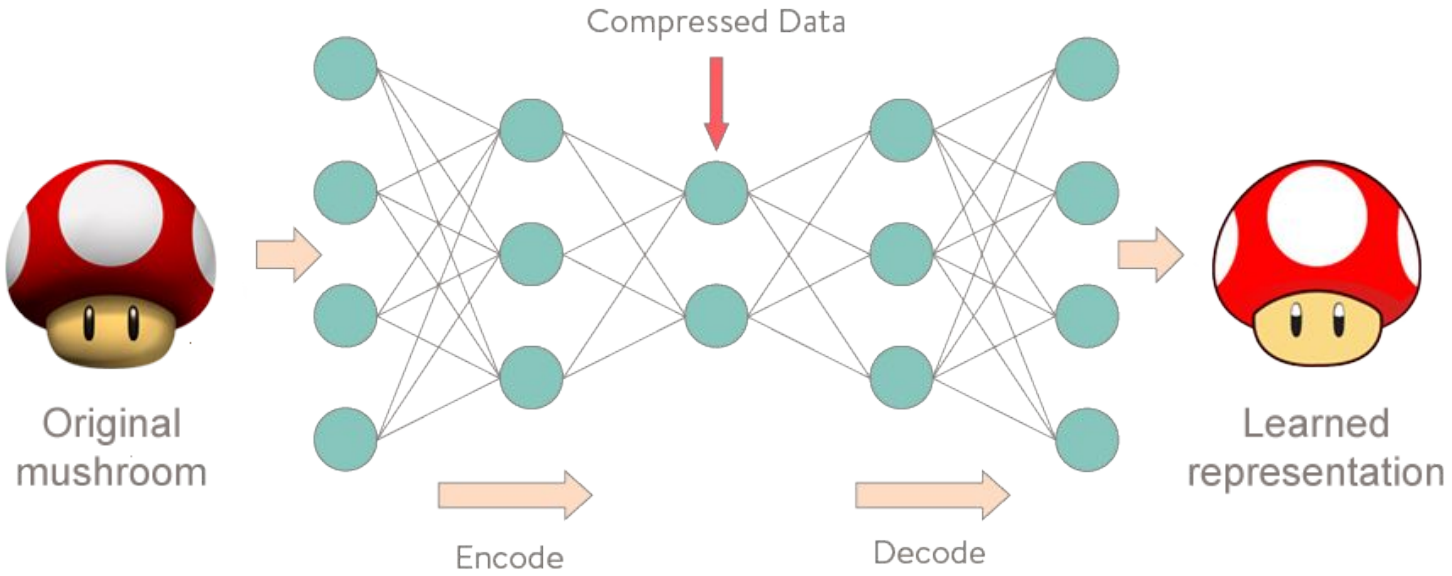
RICO Dataset contém 66.000 imagens de interfaces de aplicativos.





Fonte: https://interactionmining.org/rico

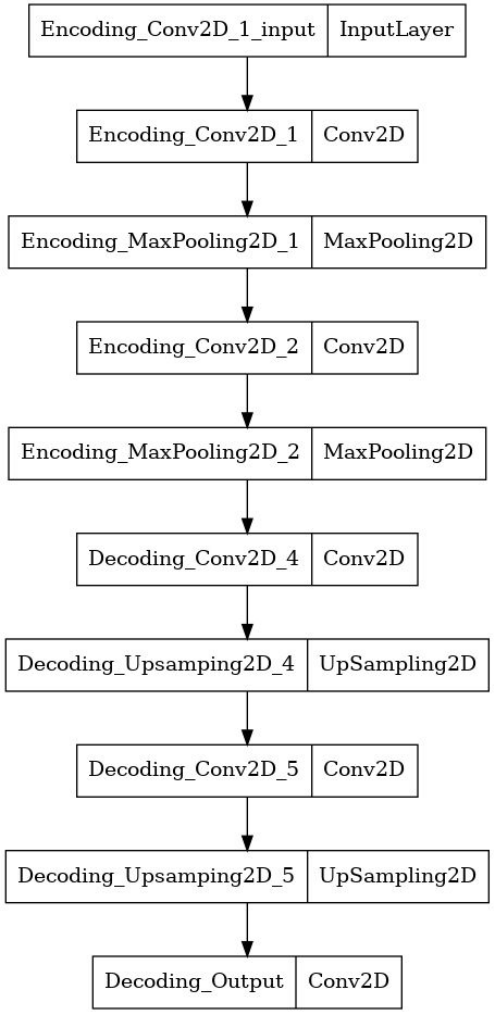
Autoencoder



Fonte: https://curiousily.com/posts/data-imputation-using-autoencoders/

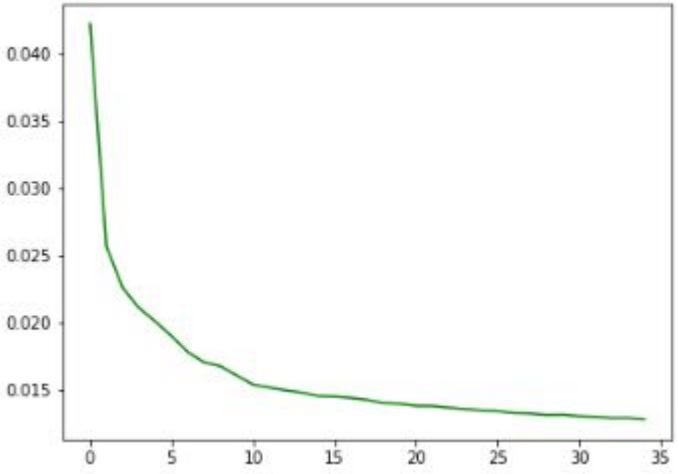
Autoencoder Proposto 1

Entrada: Imagem (64x64x3)



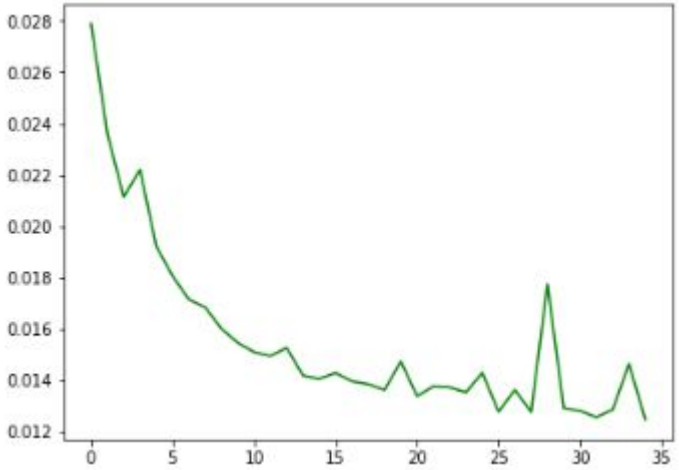
Treinamento do Autoencoder (Loss Function)

Treino



loss: 0.0128

Validação



val_loss: 0.0125

Codificador

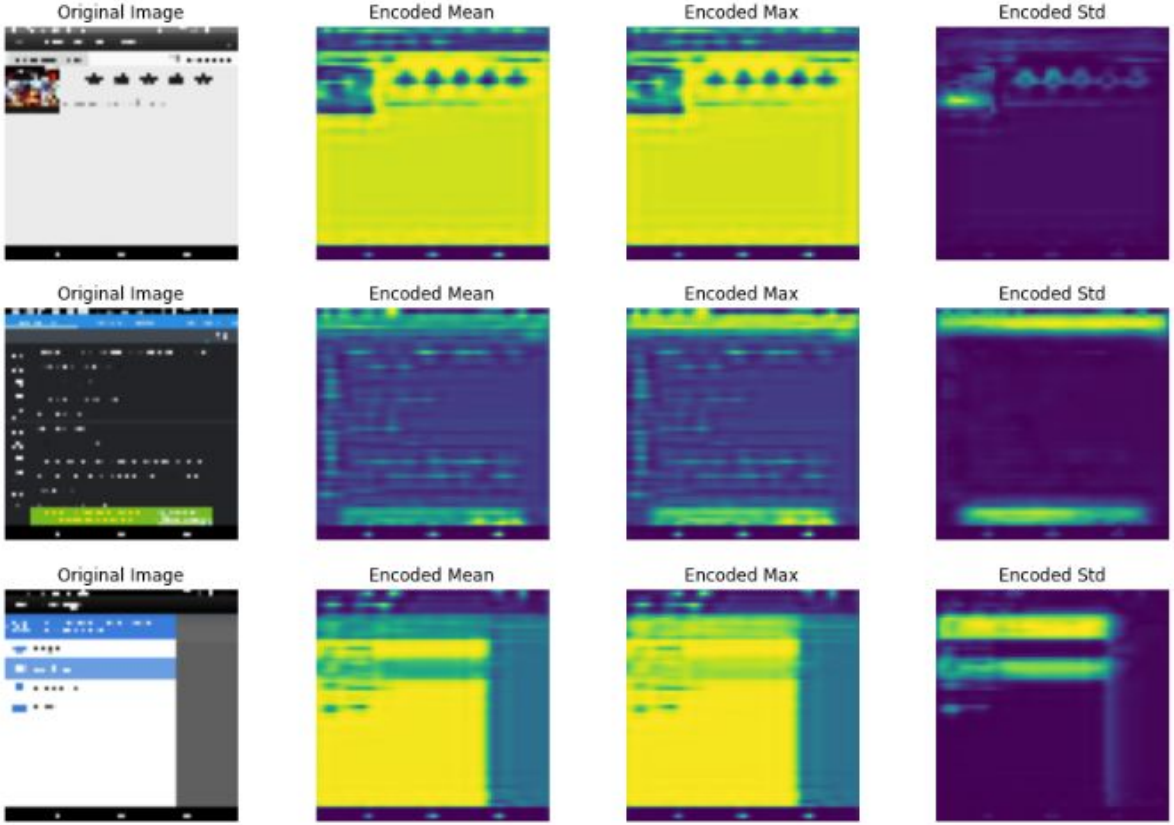
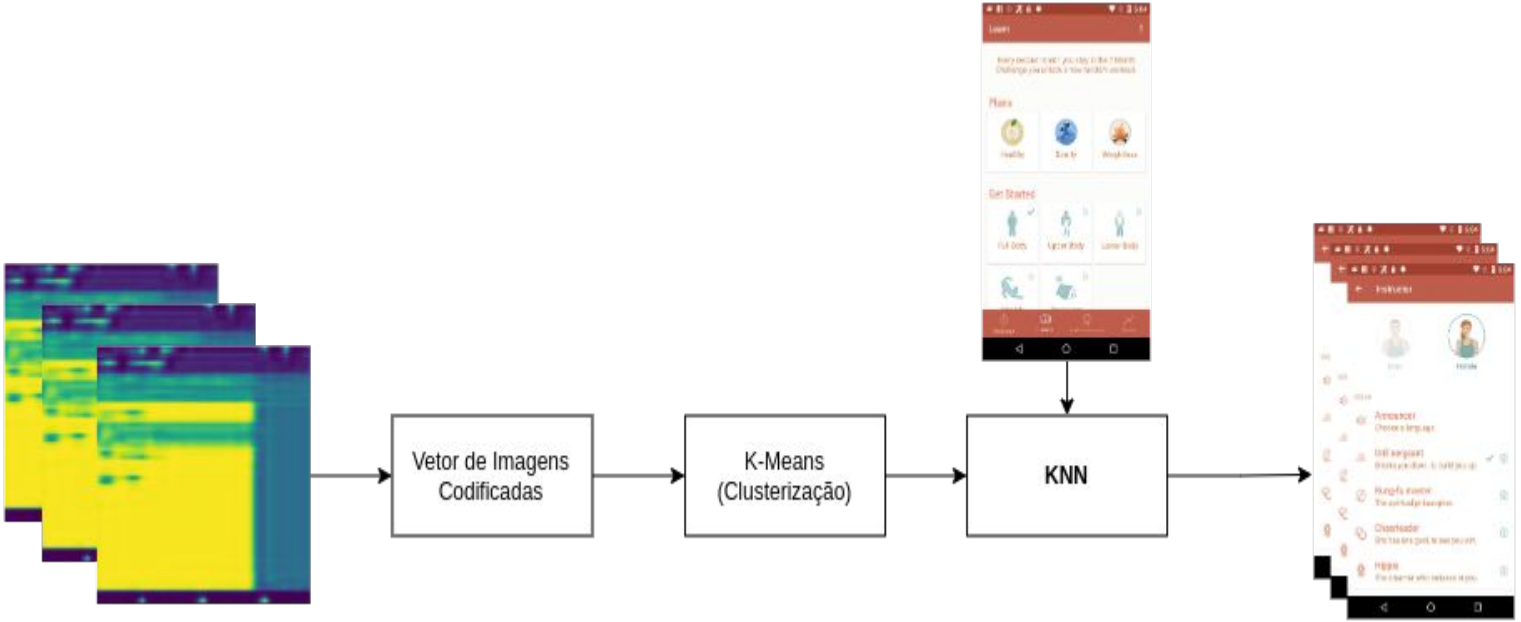
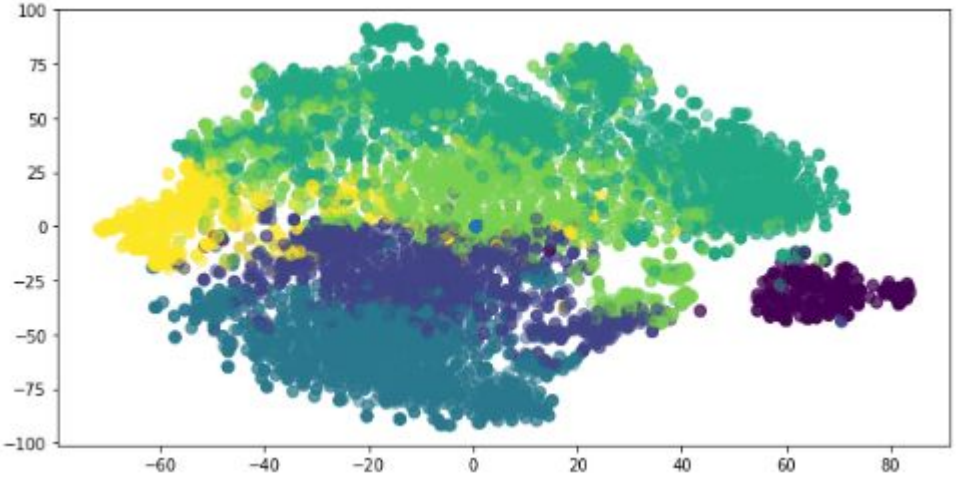


Imagem decodificada

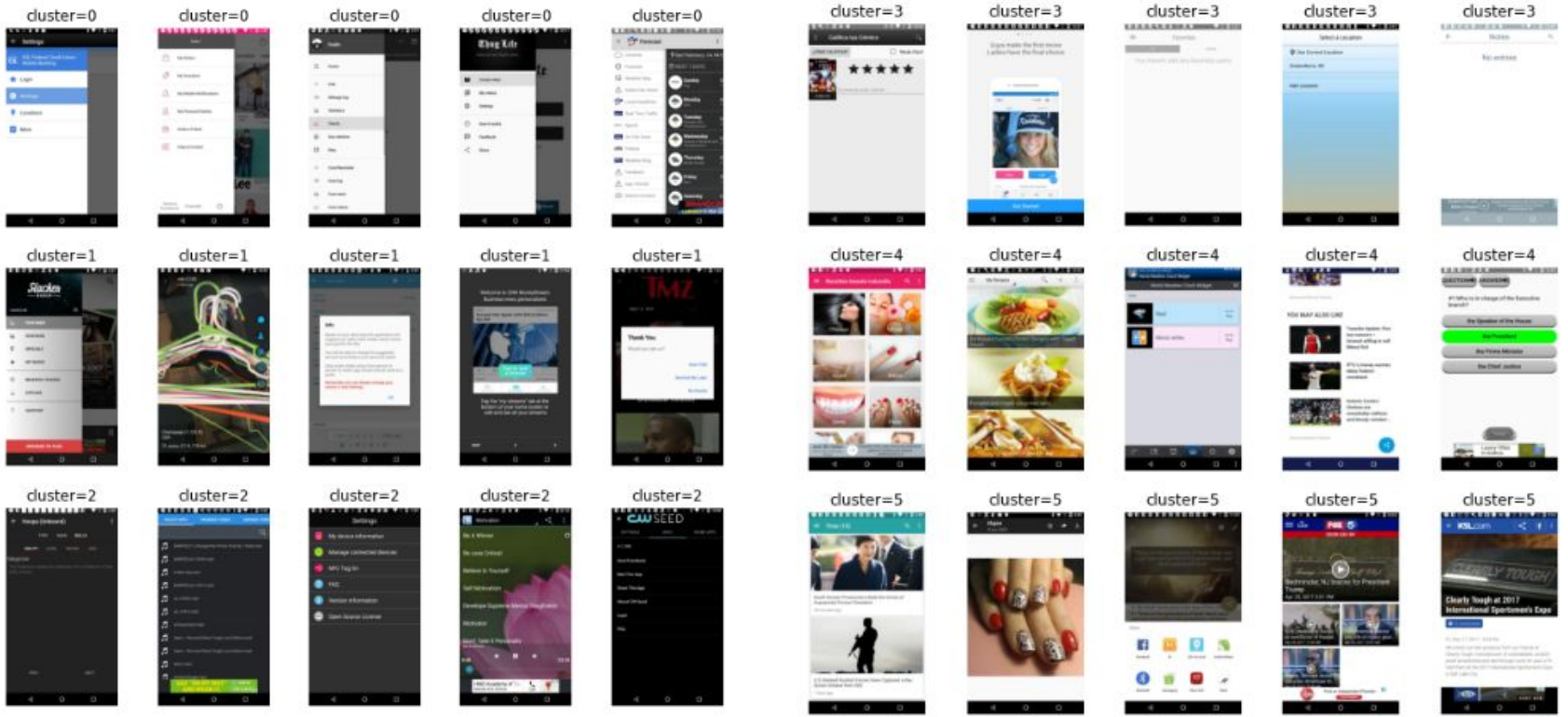
Arquitetura do Modelo



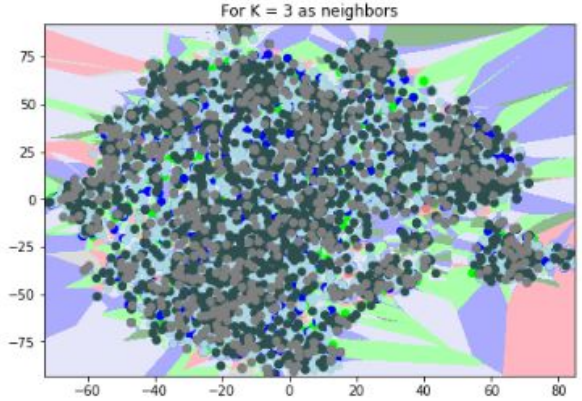
K-Means (N = 6)

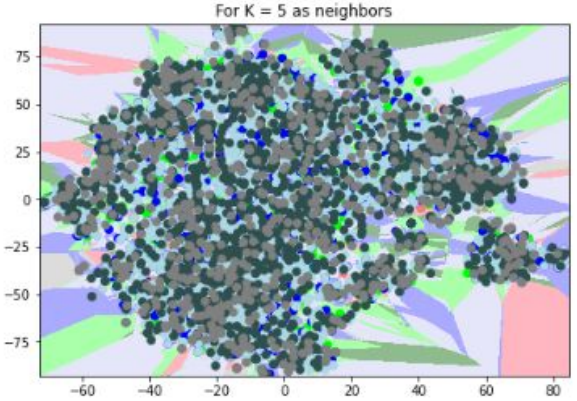


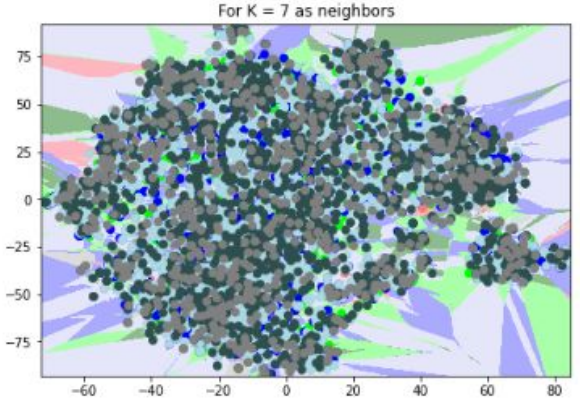
Clusters


cluster=0
cluster=0
cluster=0
cluster=0
cluster=0
cluster=3
cluster=3
cluster=3
cluster=3
cluster=3
cluster=1
cluster=1
cluster=1
cluster=1
cluster=1
cluster=4
cluster=4
cluster=4
cluster=4
cluster=4
cluster=2
cluster=2
cluster=2
cluster=2
cluster=2
cluster=5
cluster=5
cluster=5
cluster=5
cluster=5

KNN


For K = 3 as neighbors
75
50
25
0
−25
−50
−75
−60
−40
−20
0
20
40
60
80


For K = 5 as neighbors
75
50
25
0
−25
−50
−75
−60
−40
−20
0
20
40
60
80


For K = 7 as neighbors
75
50
25
0
−25
−50
−75
−60
−40
−20
0
20
40
60
80

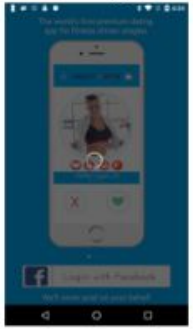
Resultados

Query Image 13426.jpg

13425.jpg

13428.jpg

11553.jpg



1854.jpg

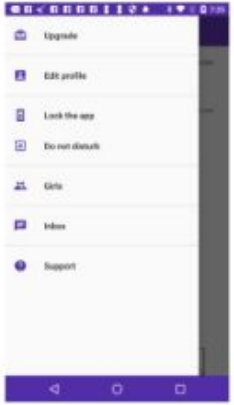
10427.jpg

14015.jpg

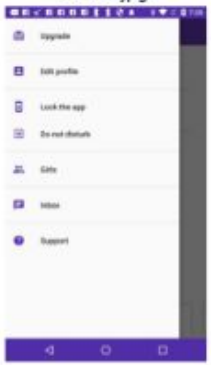
13247.jpg

Resultados

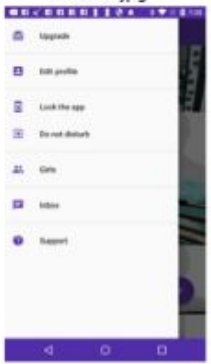
Query Image



19307.jpg

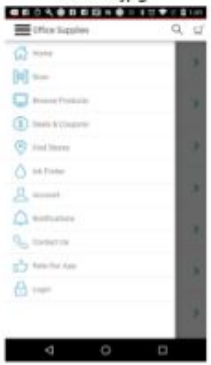


19308.jpg

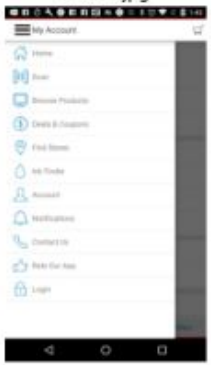


13473.jpg

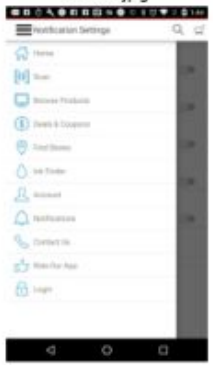
12904.jpg



12913.jpg



12918.jpg



1684.jpg

Resultados

Query Image

17008.jpg

10119.jpg

1134.jpg

1131.jpg

1133.jpg

1128.jpg

1350.jpg

Resultados

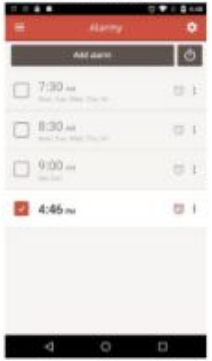
Query Image

1347.jpg

1358.jpg

1353.jpg

1874.jpg



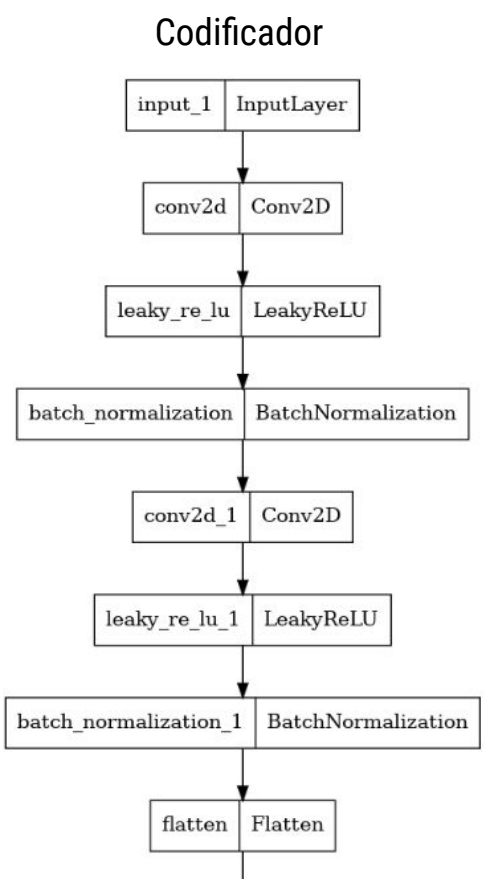
13081.jpg

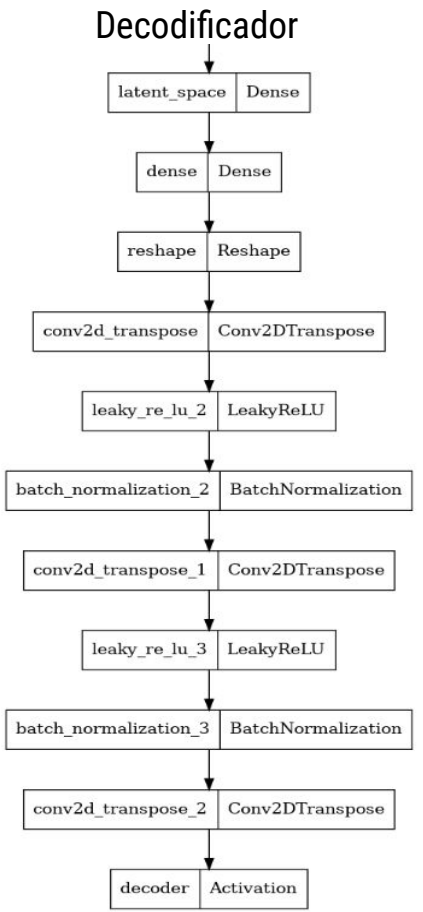
13080.jpg

15202.jpg

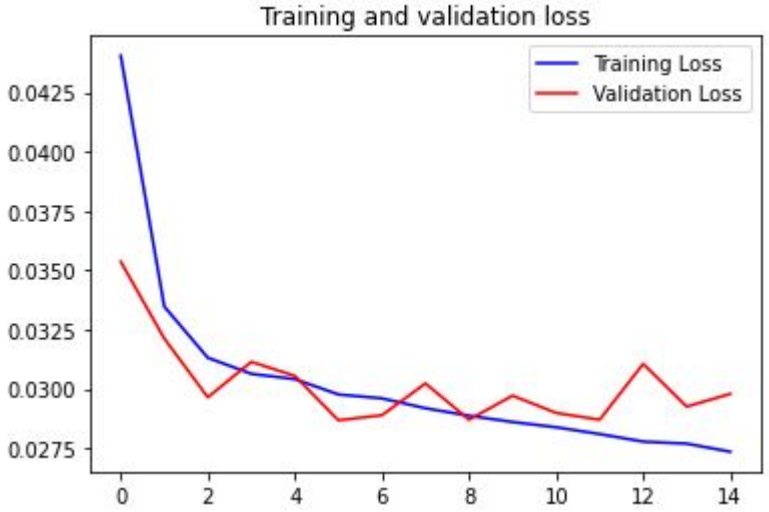
Autoencoder Proposto 2

Entrada: Imagem (64x64x3)



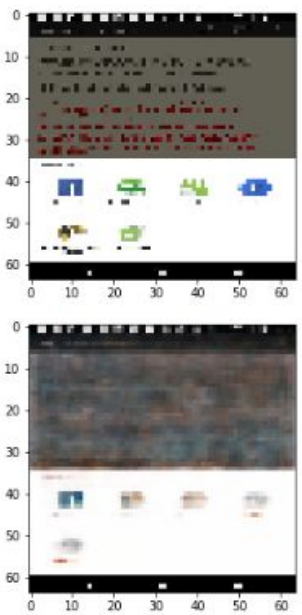


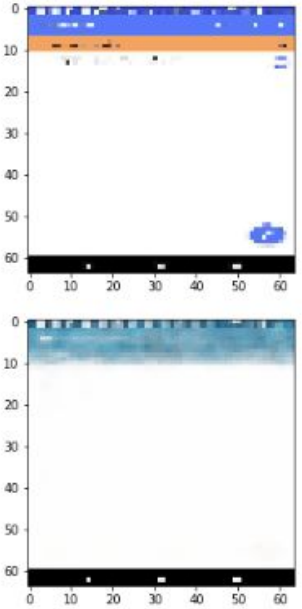
Treinamento do Autoencoder (Loss Function)



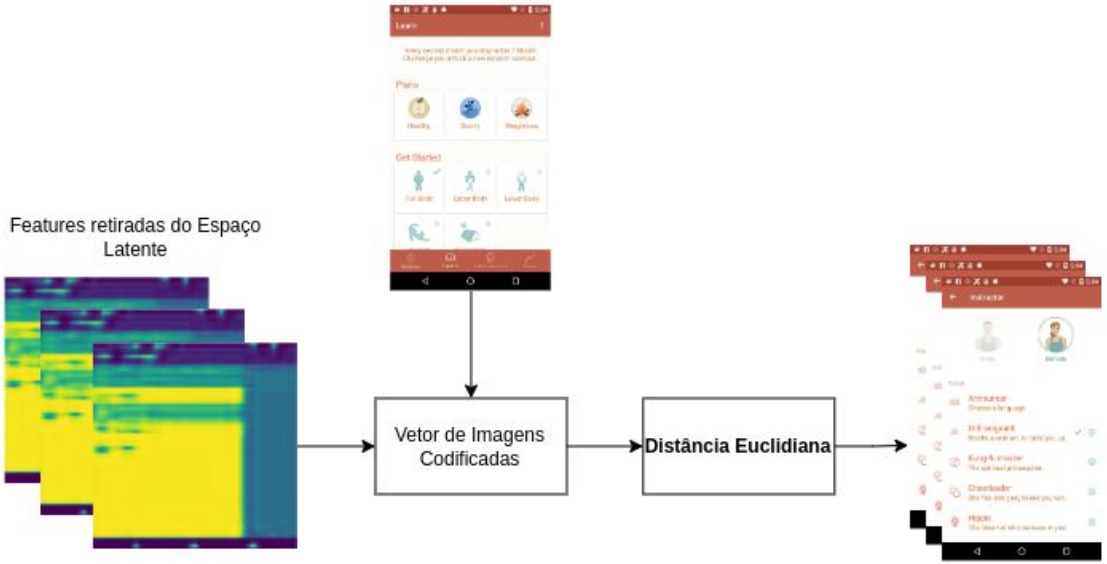
loss: 0.0274
val_loss: 0.0298

Imagem Decodificada



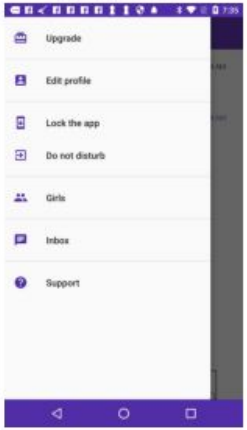


Arquitetura do Modelo

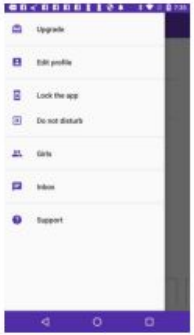


Resultados

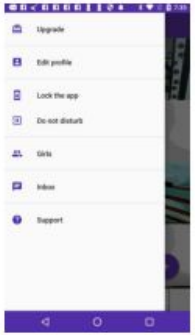
Query Image



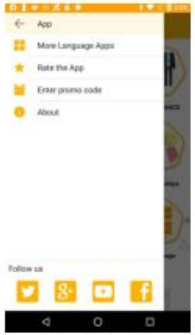
E. Distance: 8.65



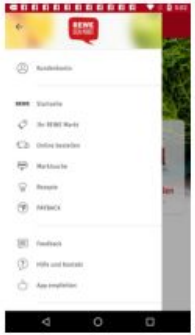
E. Distance: 248.35



E. Distance: 873.61

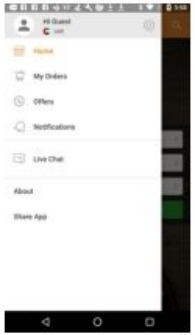


E. Distance: 939.58

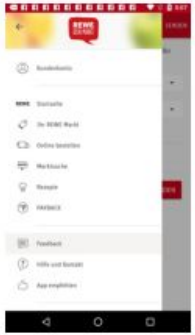


E. Distance: 999.31

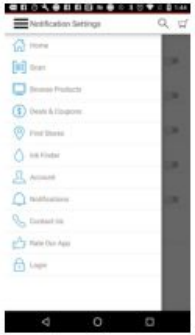
E. Distance: 1001.60



E. Distance: 1009.41



E. Distance: 1012.70



Resultados

Query Image

E. Distance: 1046.06

E. Distance: 1049.25

E. Distance: 1097.09

E. Distance: 1117.33

E. Distance: 1138.41

E. Distance: 1140.48

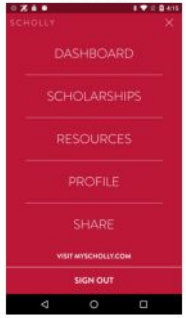
E. Distance: 1148.70

E. Distance: 1149.29

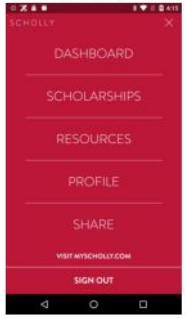
Comparação Autoencoders

Query Image

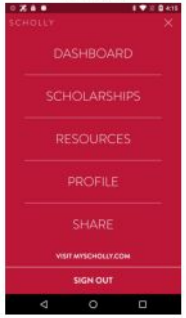
1



1133.jpg



1134.jpg



1128.jpg

1131.jpg

10119.jpg

17008.jpg

11385.jpg

2

E. Distance: 1046.06

E. Distance: 1049.25

E. Distance: 1097.09


E. Distance: 1117.33

E. Distance: 1138.41


E. Distance: 1140.48

E. Distance: 1148.70

Referências

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LEIVA, Luis A.; HOTA, Asutosh; OULASVIRTA, Antti. Enrico: A dataset for topic modeling of mobile UI designs. In: **22nd International Conference on Human-Computer Interaction with Mobile Devices and Services**. 2020. p. 1-4.

NAVEIRO, Luciano. Querying Similar Images with TensorFlow. **Medium**, 2019. Disponível em: https://medium.com/@luchonaveiro/querying-similar-images-with-tensorflow-59e3a7aad40e. Acesso em: 10 de dezembro de 2022.

Dúvidas

Obrigado.