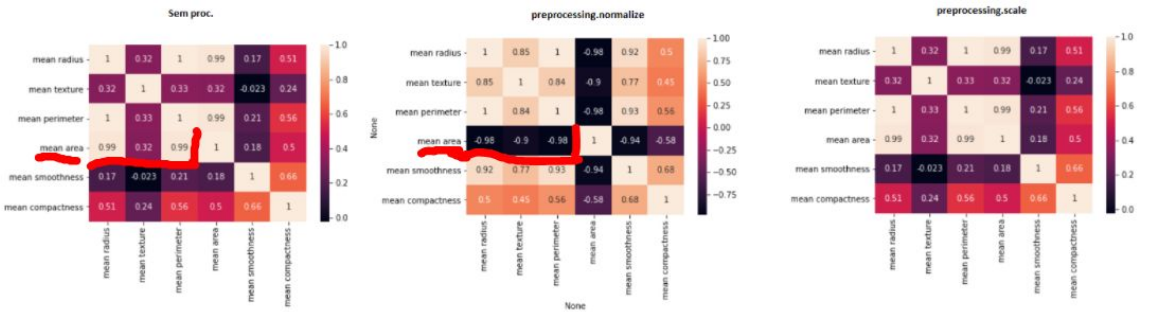
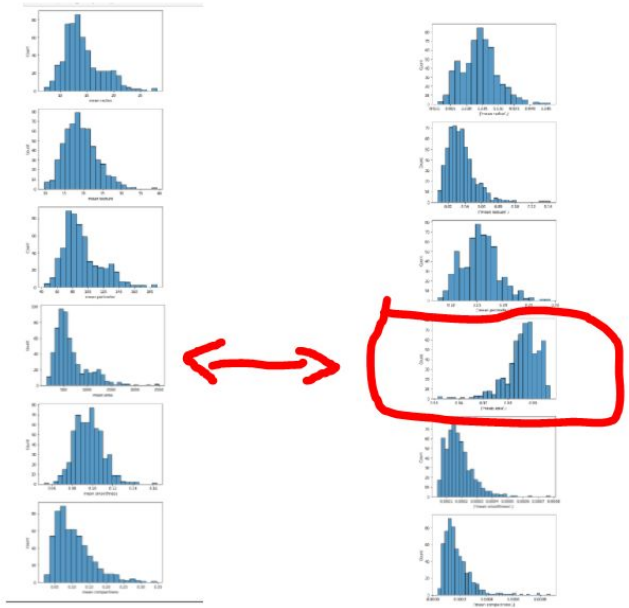
Estudo do efeito da normalização no cálculo da correlação

- Dataset com features sobre câncer de mama
- Dados em diferentes escalas
- Dados com distribuição assimétrica (skewed -> outliers)

Caso 1: sem processamento x
preprocessing.normalize x
preprocessing.scale


Sem proc.
preprocessing.normalize
preprocessing.scale
mean radius
mean texture
mean perimeter
mean area
mean smoothness
mean compactness
None



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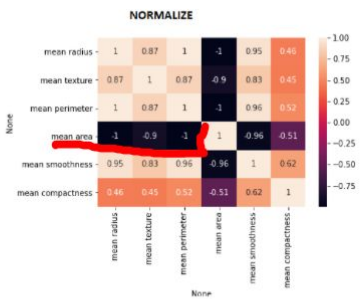
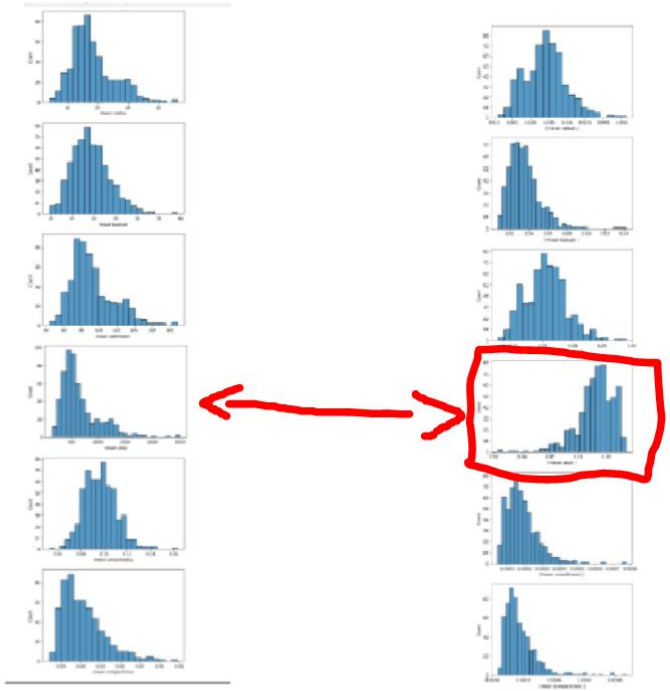
SEM PROC
mean radius
mean texture
mean perimeter
mean area
mean smoothness
mean compactness


NORMALIZE
mean radius
mean texture
mean perimeter
mean area
mean smoothness
mean compactness


SCALER/STANDARDIZE
mean radius
mean texture
mean perimeter
mean area
mean smoothness
mean compactness



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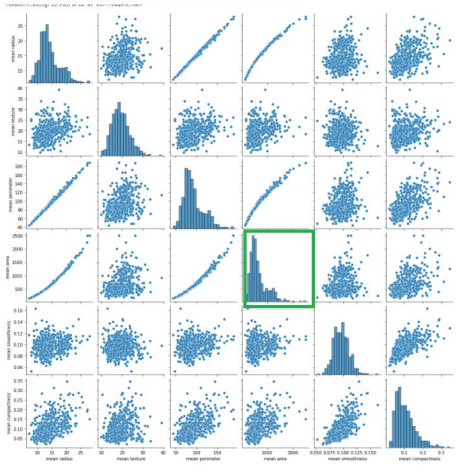
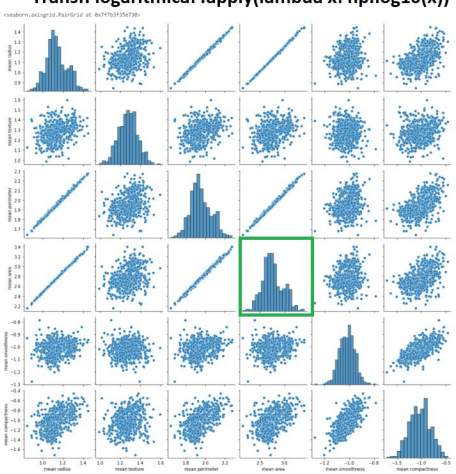
Caso 2: Sem processamento x
Transformação Logarítmica para normalização

SEM PRE PROCESSAMENTO



Transf. logarítmica: .apply(lambda x: np.log10(x))



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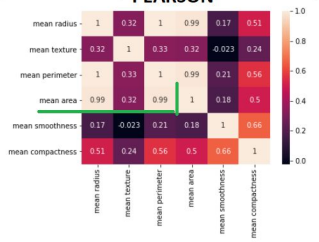

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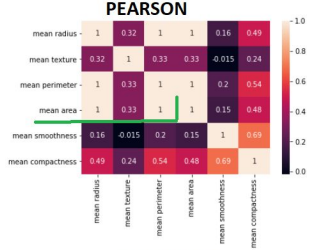
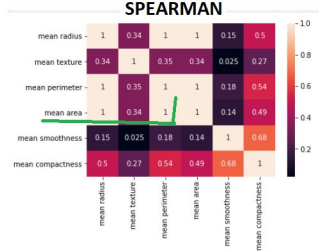
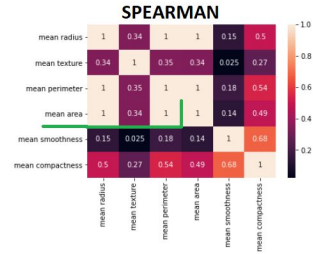


SPEARMAN

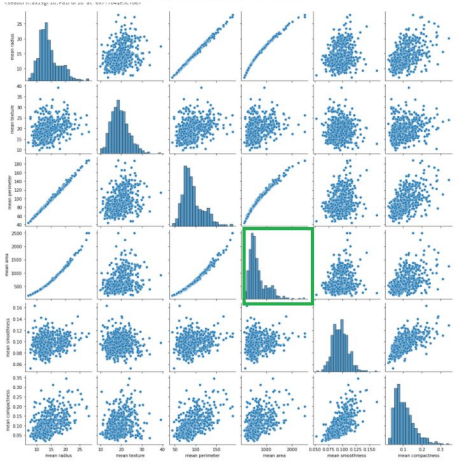


SPEARMAN

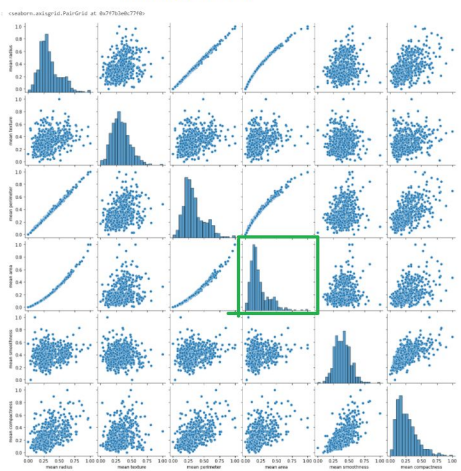


Caso 3: Sem processamento x MinMax Scaler para normalização

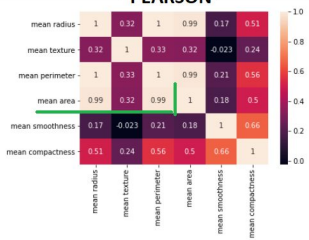
SEM PRE PROCESSAMENTO



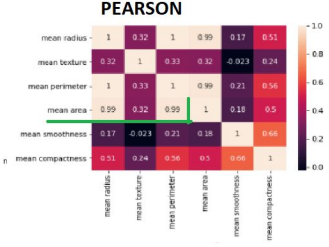
MinMax Scaler



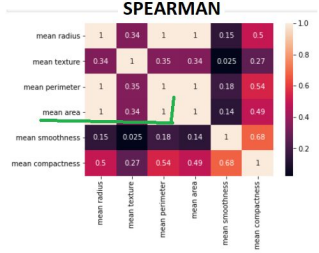
PEARSON



PEARSON



SPEARMAN



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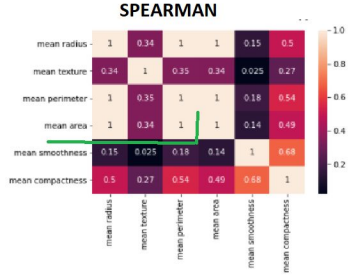
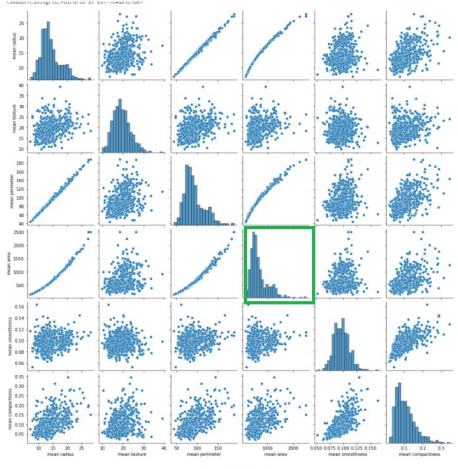


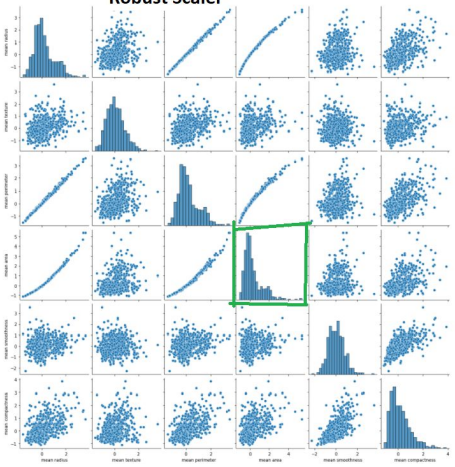
Caso 4: Sem processamento x Robust Scaler

- with_centering = True, with_scaling = True

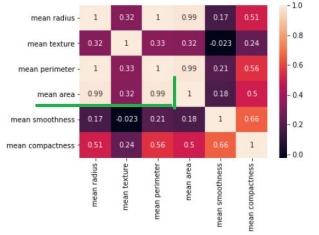
SEM PRE PROCESSAMENTO



Robust Scaler



PEARSON



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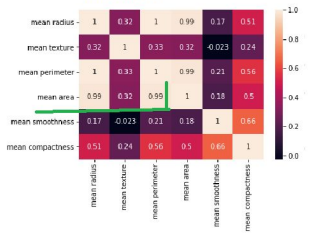
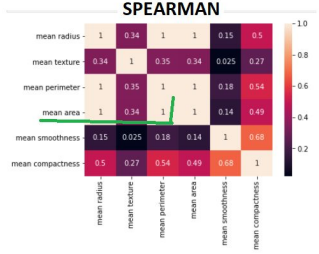


SPEARMAN



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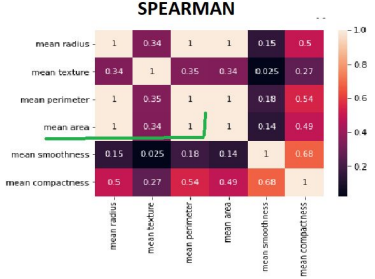
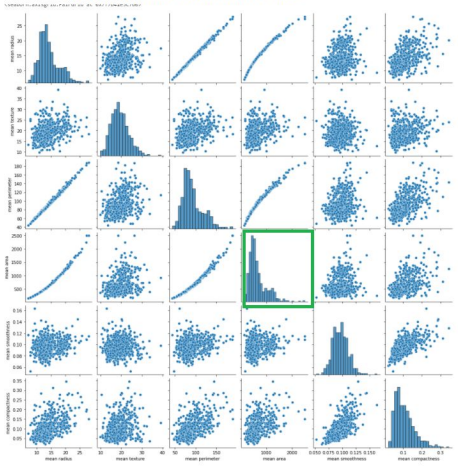
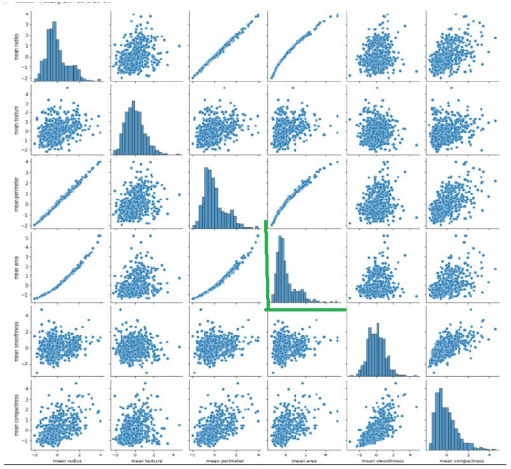


Caso 5: Sem processamento x Standard Scaler

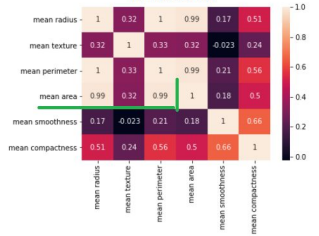
SEM PRE PROCESSAMENTO



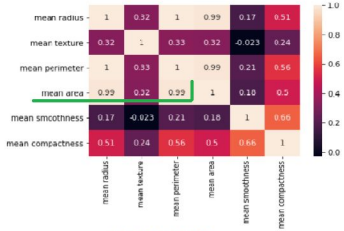
Standard Scaler



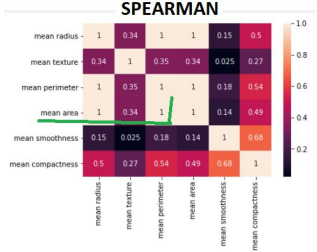
PEARSON



PEARSON



SPEARMAN



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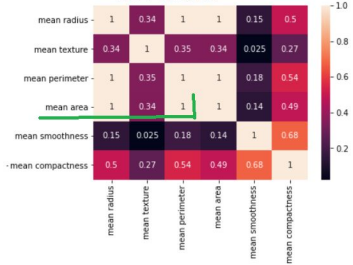


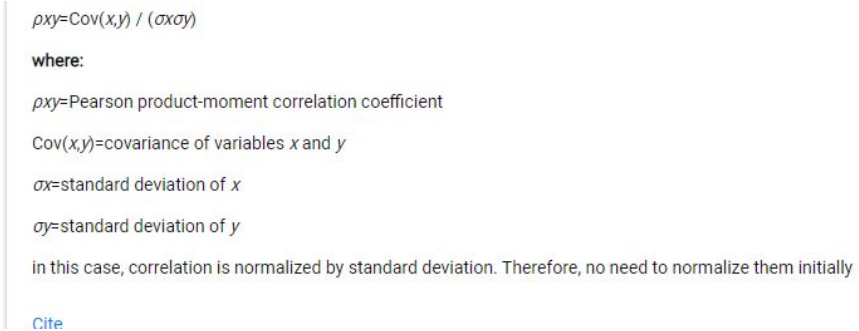
Conclusões

- Tanto normalização quanto escalonamento não parecem influenciar na correlação.

- A função preprocessing.normalize deve ser utilizada apenas para vetores : https://scikit-learn.org/stable/modules/generated/sklearn.preprocessing.normalize.html

- Discussão sobre o assunto:

https://www.researchgate.net/post/Do_we_need_to_standardize_variables_with_different_scales_before_doing_correlation_analysis



ρxy=Cov(x,y) / ($\sigma x \sigma y$)

where:

ρxy=Pearson product-moment correlation coefficient

Cov(x,y)=covariance of variables x and y

σx=standard deviation of x

σy=standard deviation of y

in this case, correlation is normalized by standard deviation. Therefore, no need to normalize them initially

Cite

Links utilizados

- https://www.researchgate.net/post/Do_we_need_to_standardize_variables_with_different_scales_before_doing_correlation_analysis
- https://machinelearningmastery.com/standardscaler-and-minmaxscaler-transforms-in-python/
- https://scikit-learn.org/stable/modules/generated/sklearn.preprocessing.normalize.html
- https://scikit-learn.org/stable/modules/generated/sklearn.preprocessing.RobustScaler.html?highlight=robust%20scaler#sklearn.preprocessing.RobustScaler
- https://scikit-learn.org/stable/modules/generated/sklearn.preprocessing.minmax_scale.html?highlight=min%20max#sklearn.preprocessing.minmax_scale