DigiOnco: A Pipeline to Unveil Digital Non-Invasive Biomarkers from Multi-parametric Radiomics Footprints

Michael Shell, *Member, IEEE,* John Doe, *Fellow, OSA,* and Jane Doe, *Life Fellow, IEEE*

Abstract—The abstract goes here.

Index Terms—Computer Society, IEEE, IEEEtran, journal, LaTeX, paper, template.

1 Study Results

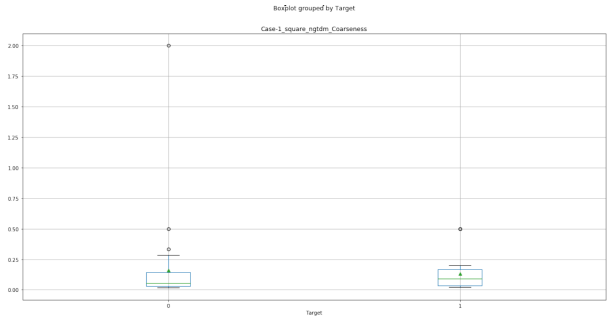
The following material describes the entire result set obtained during the study. To recapitulate, our study consisted of two classification tasks namely, TN vs Non-TN and TN vs Luminal-A vs HER. Once the training phase is completed the model configuration is loaded into the testing mechanism. The test data consisted solely of Luminal-B patients given the correlation of Luminal-A and Luminal-B data characteristics. The results described in the main material concludes at the training phase and provides a taste of the actual digital biomarkers obtained. Tables 1 and 2 provide a summary of the features selected after the preprocessing step. The selection is done mainly on the amount of distingushing information each feature offers. Moreover, various filters have also been applied to provide a expansive view. The corresponding box plots having been shown in Figure Sets 1 and 2. Notice that not all box plots can be utilized optimally for distinuishing the different classes due to closeness in the measured value. To counter this problem, we introduced the concept of higher dimension plots which provide a user-friendly interface to the end user. A clear correlation can be established between the features and targets resulting in a more informed decision making stance.

TABLE 1
Final Feature Set for TN vs Non-TN

Sr. No.	Feature	Filter
1	Coarseness	Square
2	Cluster_Shade	Laplacian of Gaussian, Sigma = 3
3	Cluster_Shade	-
4	Minimum	Square
5	Mean	Wavelet = HHH
6	Skewness	Wavelet = HHH
7	Correlation	Wavelet = HHH
8	Energy	Wavelet = HHL
9	Energy	Wavelet = HLH
10	Mean	Wavelet = HLH
11	Skewness	Wavelet = HLH
12	Energy	Wavelet = HLL
13	Cluster_Shade	Wavelet = LHH
14	Energy	Wavelet = LLH
15	Energy	Wavelet = LLL
16	Skewness	Wavelet = LLH

TABLE 2
Final Feature Set for TN vs Luminal-A vs HER

Sr. No.	Feature	Filter
1	Kurtosis	Exponential
2	Cluster_Tendency	Square
3	Cluster_Prominance	Square
4	MCC	Square
5	Cluster_Shade	Square
6	Mean	Wavelet = HHL
7	Energy	Wavelet = HHL
8	Skewness	Wavelet = HLL
9	Energy	Wavelet = HLL
10	Energy	Wavelet = LHH
11	Energy	Wavelet = LHL
12	Cluster_Prominance	Wavelet = LLH
13	Skewness	Wavelet = LLH
14	Cluster_Shade	Laplacian of Gaussian, Sigma = 3
15	Cluster_Shade	-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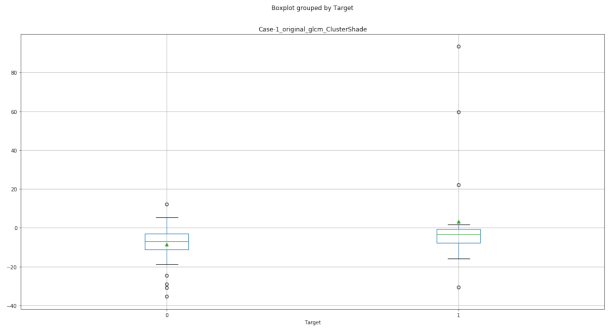
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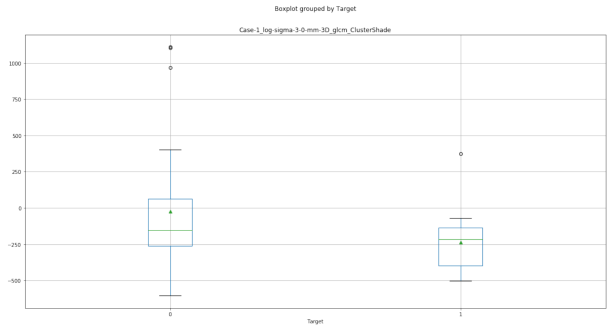
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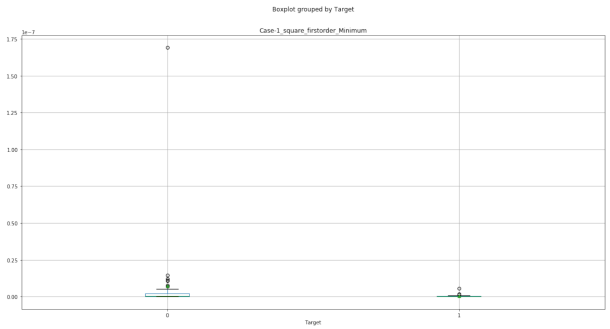
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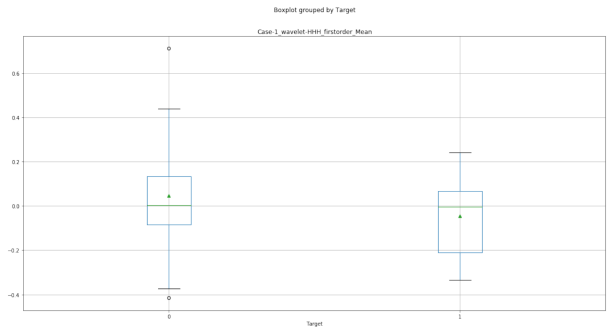
Target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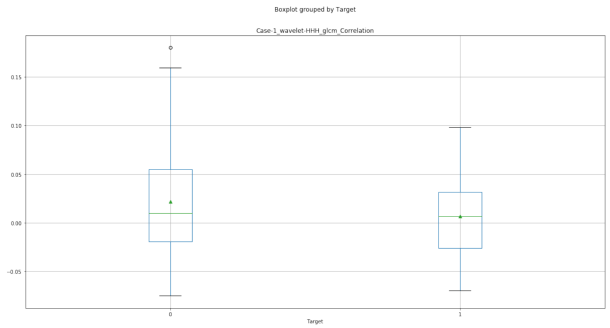
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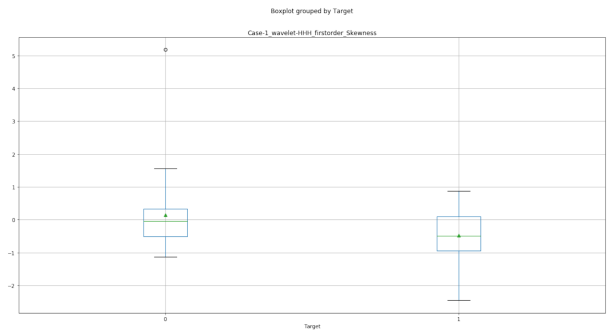
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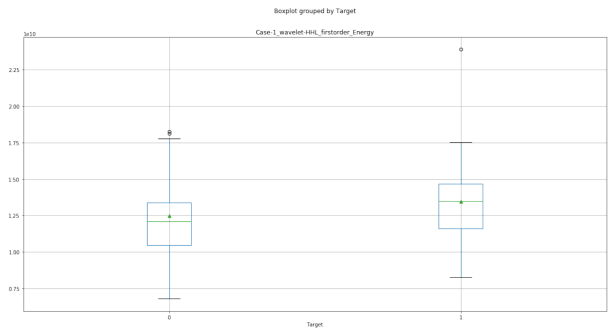
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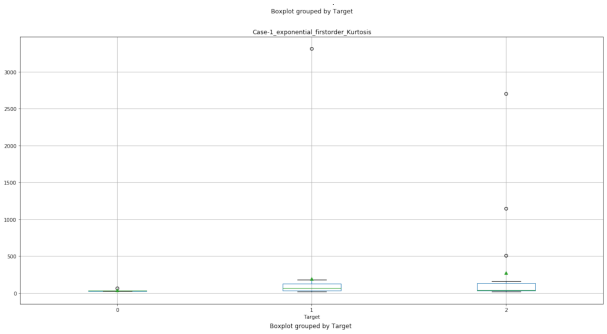
Target

Fig. 1. Boxplots for TN vs Non-TN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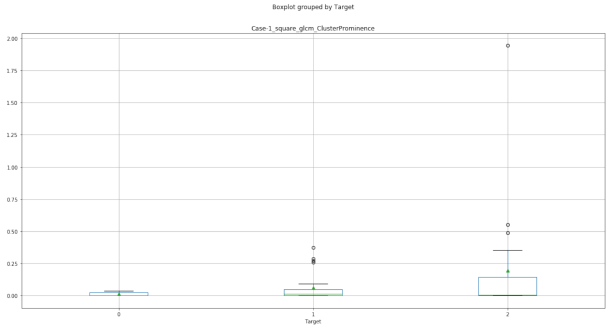
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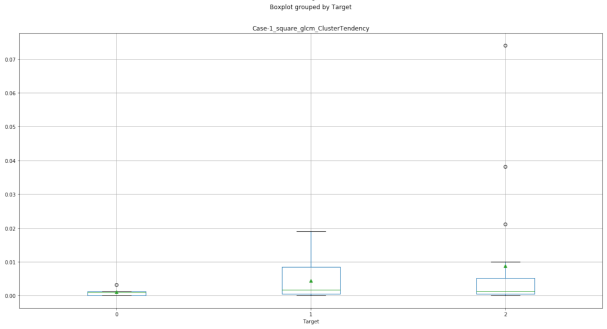
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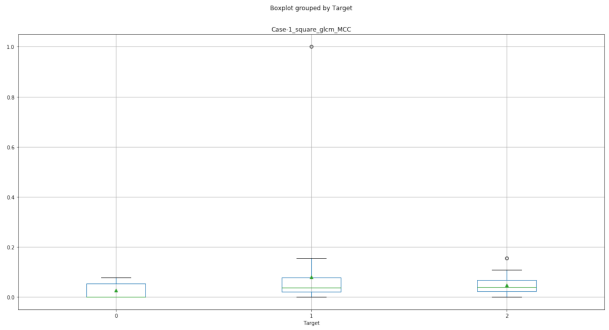
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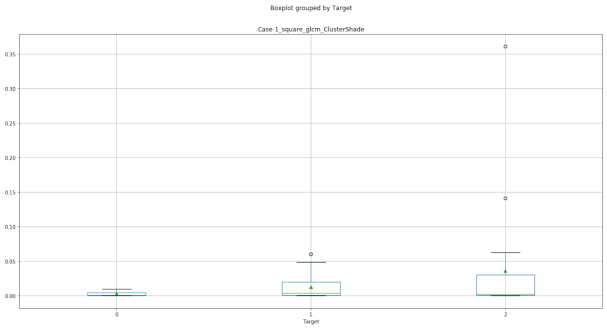
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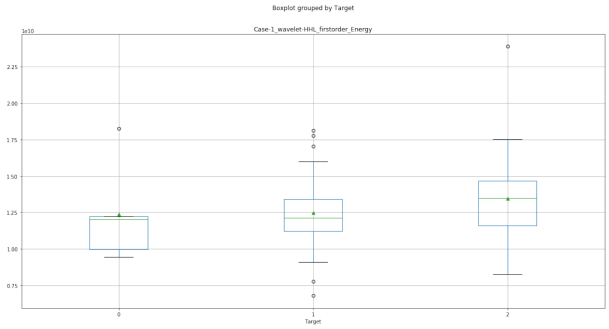
Target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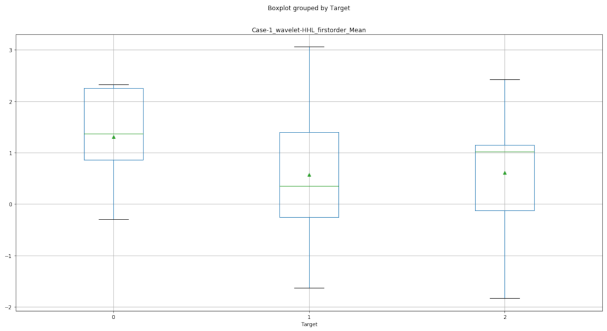
Case-1_wavelet-HHL_firstorder_Energy
1e10
Target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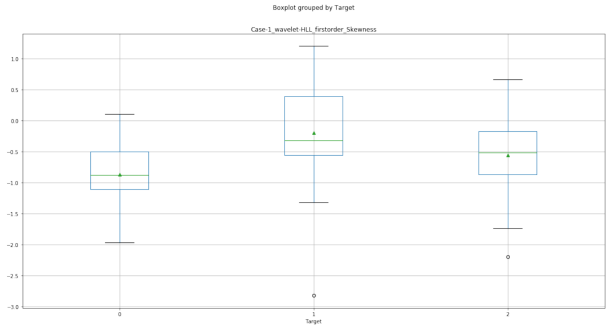
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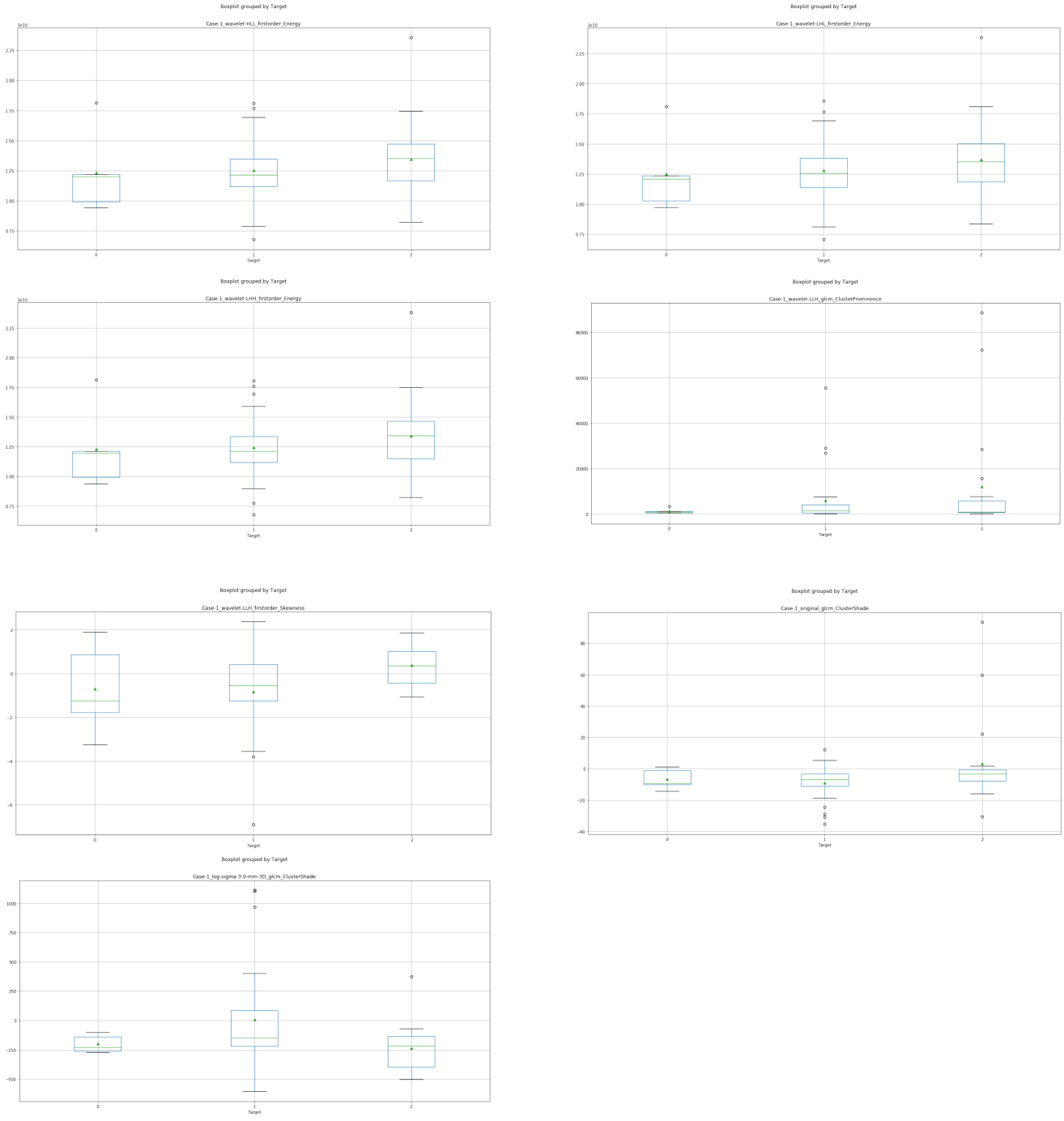

Fig. 2. Boxplots for TN vs Luminal A vs HER

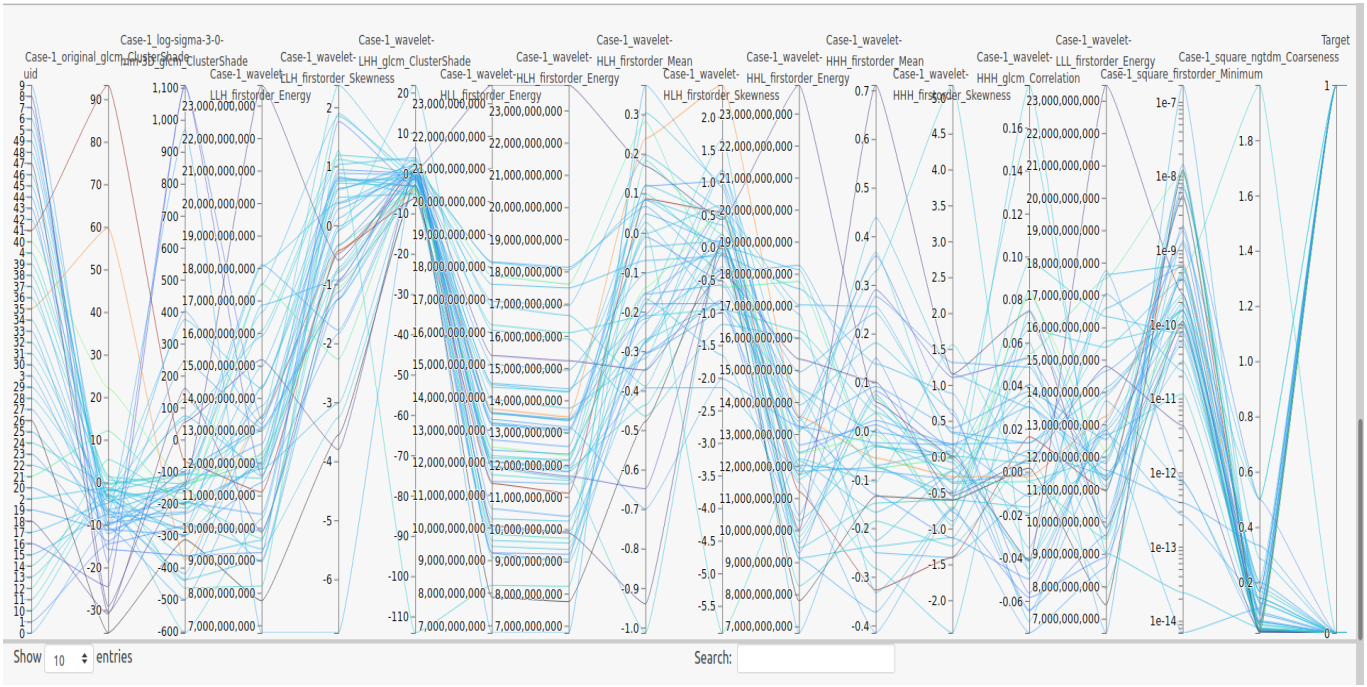

Fig. 3. Binary Higher Dimensional Plot

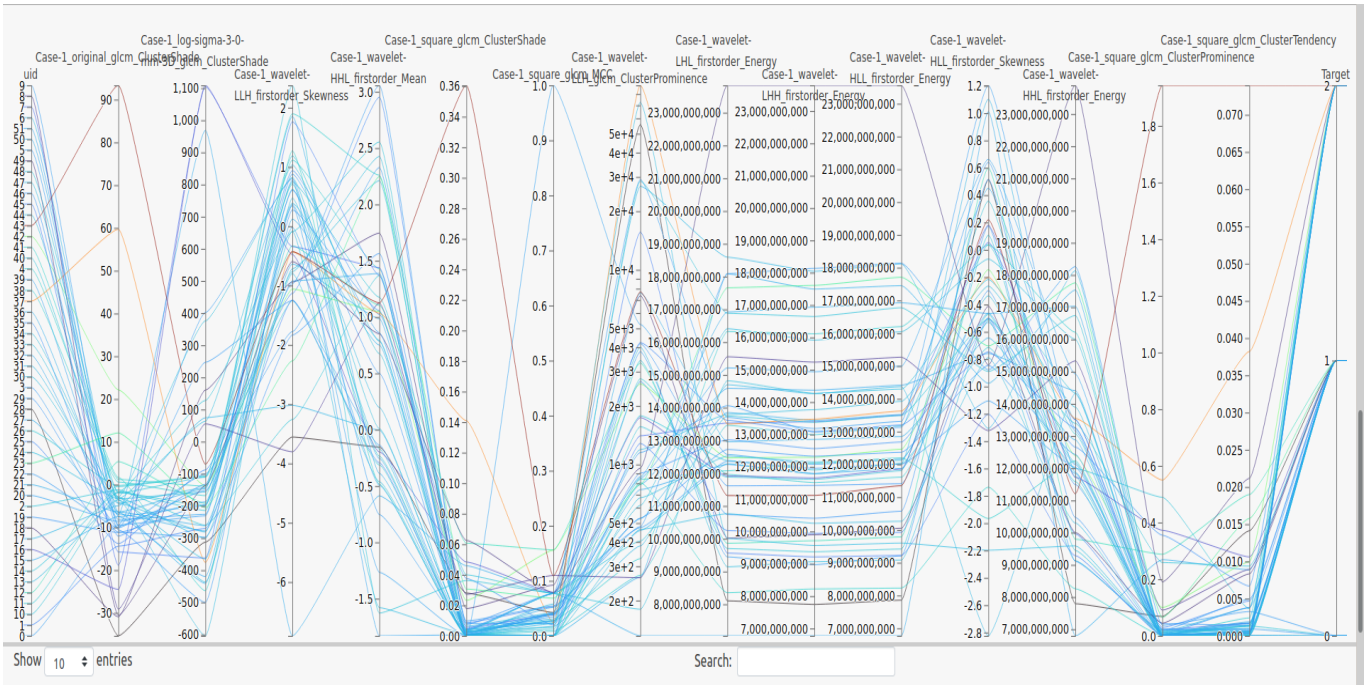

Fig. 4. Ternary Higher Dimensional Plot