Supplementary Material

1 Supplementary Material

1.1 Tumor segmentation guidance

Delineation based on CT images was performed by two doctors in Weihai Municipal Hospital, Weihai, Shandong, China (Dr. Ailing Liu, Department of Respiratory Internal Medicine; Dr. Guiyuan Liu, Department of Radiology) who were blinded to the patient cohort using a standard clinical delineation protocol. In our study, we follow the following principles of tumor segmentation:

1) For patients with only one lesion (diameter $\geq 1\text{cm}$), the lesions with relatively clear edges were directly selected for segmentation;

2) For patients with multiple lesions on one side of the lung, the lesion with the largest diameter is selected for segmentation;

3) For patients with peripheral lung cancer located in the lung field and away from the chest wall were selected for segmentation;

4) For patients with non-mass lesions were excluded.

Semi-automated segmentation

In the segmentation module, it first used a magic wand-like tool (Level Tracing) in 3D Slicer, put the mouse in the place that the expert thinks is appropriate, moving the mouse defines an outline where the pixels all have the same background value as the current background pixel, the tool will automatically select the appropriate area. If the segmentation wasn't right, the experts could correct it manually using the brush tool and eraser to make certain adjustments according to the situation until the expert thinks it is appropriate. (https://www.slicer.org/wiki/Documentation/4.8/Modules/Editor#Wand).

1.2 Radiomics Features

Due to the excessive number of radiomics features, please refer to the following website for calculation methods for each feature: https://pyradiomics.readthedocs.io/en/latest/features.html.

All radiomics features used in this article were divided into the following three groups:

Group1. First Order Features (18 features, except Standard Deviation)

Group2. Shape Features(3D) (14 features, except Compactness 1 and Compactness 2)

Group3. Texture Features

1) Gray Level Co-occurrence Matrix (GLCM) Features (22 Features, except DEPRECATED. Homogeneity 1 and DEPRECATED. Homogeneity 2)

2) Gray Level Size Zone Matrix (GLSZM) Features (16 Features)

3) Gray Level Run Length Matrix (GLRLM) Features (16 Features)

4) Neighbouring Gray Tone Difference Matrix (NGTDM) Features (5 Features)
5) Gray Level Dependence Matrix (GLDM) Features (14 features)

1.3 Image Filters

1.3.1 Laplacian of Gaussian Filter

Applies a Laplacian of Gaussian filter to the input image and yields a derived image for each sigma value specified. A Laplacian of Gaussian image is obtained by convolving the image with the second derivative (Laplacian) of a Gaussian kernel.

The Gaussian kernel is used to smooth the image and is defined as

$$G(x, y, z, \sigma) = \frac{1}{(\sigma \sqrt{2\pi})^3} e^{-\frac{x^2+y^2+z^2}{2\sigma^2}}$$

The Gaussian kernel is convolved by the Laplacian kernel $\nabla^2 G(x, y, z)$, which is sensitive to areas with rapidly changing intensities, enhancing edges. The width of the filter in the Gaussian kernel is determined by $\sigma$ and can be used to emphasize more fine (low $\sigma$ values) or coarse (high $\sigma$ values) textures.

The $\sigma$ value used in this article was 1, 2, 3, 4, 5. We calculated the first order statistics described in Group 1 and the texture features described in Group 3 in an image with this filter.

1.3.2 Wavelet Filter

Wavelet transform effectively decouples texture information by decomposing the original image at low and high frequencies. In this study, a three-dimensional wavelet transform was applied to each CT image, and the original image $X$ was divided into eight decompositions. Think of $L$ and $H$ as low-pass and high-pass functions, respectively, and mark the wavelet decomposition of $X$ as $X_{LLL}$, $X_{LHL}$, $X_{HLL}$, $X_{LHH}$, $X_{HLH}$, $X_{HHL}$, $X_{HHH}$. For example, $X_{LLL}$ as a high-pass sub band, by a low-pass along the x direction. Directional filtering of the filter, a low pass filter along the y direction and a low pass filter along the z direction, and constructed as:

$$X_{LLL}(i, j, k) = \sum_{p=1}^{N_L} \sum_{q=1}^{N_L} \sum_{r=1}^{N_L} L(p)L(q)L(r)X(i+p, j+q, k+r)$$

Where $N_L$ is the length of the $L$ filter. Other decompositions are constructed in a similar manner, applying their respective low pass or high pass filtering order in the x, y and z directions. Since the applied wavelet decomposition is unextracted, the size of each decomposition is equal to the original image, and for each decomposition, we calculated the first order statistics described in Group 1 and the texture features described in Group 3.

Therefore, from one original image, five images of Laplacian of Gaussian Filter, and eight wavelet decomposition images for each patient, a total of 1274 radiomics features can be calculated from group 1 and group 3, in addition, 14 features of the Group 2 (shape features) of original images was included, a total of 1288 radiomics features were used in this article.

1.4 The note of selected radiomics features

1) original_shape_Maximum2DDiameterRow

The shape feature named Maximum2DDiameterRow from original image. Maximum 2D diameter (Row) is defined as the largest pairwise Euclidean distance between tumor surface mesh vertices in the column-slice (usually the sagittal) plane.

2) original_shape_Maximum2DDiameterSlice
The shape feature named Maximum2DDiameterSlice from original image. Maximum 2D diameter (Slice) is defined as the largest pairwise Euclidean distance between tumor surface mesh vertices in the row-column (generally the axial) plane.

3) original_firstorder_Median
The first order feature named Median from original image. The median gray level intensity within the ROI.

4) log.sigma.1.0.mm.3D_gldm_DependenceVariance
The GLDM feature named DependenceVariance from image of the Laplacian of Gaussian filter which parameter $\sigma$ was 1. Dependence Variance (DV)

$$DV = \sum_{i=1}^{N_g} \sum_{j=1}^{N_d} p(i,j)(j - \mu)^2, \text{ where } \mu = \sum_{i=1}^{N_g} \sum_{j=1}^{N_d} j p(i,j)$$

Measures the variance in dependence size in the image.

5) wavelet.LLL_firstorder_Median
The first order feature named Median from image of the Wavelet Filter that a low pass filter along x direction, a low pass filter along the y direction and a low pass filter along the z direction. The median gray level intensity within the ROI.

6) wavelet.LLL_firstorder_RootMeanSquared
The first order feature named RootMeanSquared from image of the Wavelet Filter that a low pass filter along x direction, a low pass filter along the y direction and a low pass filter along the z direction. RMS is the square-root of the mean of all the squared intensity values. It is another measure of the magnitude of the image values.

7) wavelet.LLL_firstorder_Skewness
The first order feature named Skewness from image of the Wavelet Filter that a low pass filter along x direction, a low pass filter along the y direction and a low pass filter along the z direction.

$$\text{skewness} = \frac{\mu_3}{\sigma^3} = \frac{1}{N_p} \sum_{i=1}^{N_p} (X(i) - \bar{X})^3 \left( \frac{1}{N_p} \sum_{i=1}^{N_p} (X(i) - \bar{X})^2 \right)^{\frac{3}{2}}$$

Where $\mu_3$ is the 3rd central moment.

Skewness measures the asymmetry of the distribution of values about the Mean value.

8) wavelet.LLL_glcm_Idm
The GLCM feature named Idm from image of the Wavelet Filter that a low pass filter along x direction, a low pass filter along the y direction and a low pass filter along the z direction.
IDM (Inverse Difference Moment) is a measure of the local homogeneity of an image.

9) wavelet.LLL_glcm_InverseVariance

The GLCM feature named InverseVariance from image of the Wavelet Filter that a low pass filter along x direction, a low pass filter along the y direction and a low pass filter along the z direction.

\[
\text{inverse variance} = \sum_{k=1}^{N_g-1} \frac{p_{x-y}(k)}{k^2}
\]

Note that \( k = 0 \) is skipped, as this would result in a division by 0.

10) wavelet.LLL_grlm_RunLengthNonUniformityNormalized

The GLRLM feature named RunLengthNonUniformityNormalized (RLNN) from image of the Wavelet Filter that a low pass filter along x direction, a low pass filter along the y direction and a low pass filter along the z direction.

\[
\text{RLNN} = \frac{\sum_{i=1}^{N_g} \left( \sum_{j=1}^{N_g} P(i, j|\theta) \right)^2}{N_r(\theta)^2}
\]

RLNN measures the similarity of run lengths throughout the image, with a lower value indicating more homogeneity among run lengths in the image. This is the normalized version of the RLN formula.

11) wavelet.LLL_gldm_DependenceVariance

The GLDM feature named DependenceVariance from image of the Wavelet Filter that a low pass filter along x direction, a low pass filter along the y direction and a low pass filter along the z direction.

\[
DV = \sum_{i=1}^{N_g} \sum_{j=1}^{N_d} p(i, j)(j - \mu)^2, \text{ where } \mu = \sum_{i=1}^{N_g} \sum_{j=1}^{N_d} j p(i, j)
\]

Measures the variance in dependence size in the image.
## Supplementary Tables

Supplementary Tables 1. The description of 1288 features.

| Features                                | Image      | Groups       |
|-----------------------------------------|------------|--------------|
| original_shape_Elongation              | Original   | Shape Features |
| original_shape_Flatness                 | Original   | Shape Features |
| original_shape_LeastAxisLength          | Original   | Shape Features |
| original_shape_MajorAxisLength          | Original   | Shape Features |
| original_shape_Maximum2DDiameterColumn  | Original   | Shape Features |
| original_shape_Maximum2DDiameterRow     | Original   | Shape Features |
| original_shape_Maximum2DDiameterSlice   | Original   | Shape Features |
| original_shape_Maximum3DDiameter        | Original   | Shape Features |
| original_shape_MeshVolume              | Original   | Shape Features |
| original_shape_MinorAxisLength          | Original   | Shape Features |
| original_shape_Sphericity              | Original   | Shape Features |
| original_shape_SurfaceArea             | Original   | Shape Features |
| original_shape_SurfaceVolumeRatio      | Original   | Shape Features |
| original_shape_VoxelVolume             | Original   | Shape Features |
| original_firstorder_10Percentile       | Original   | First Order Features |
| original_firstorder_90Percentile       | Original   | First Order Features |
| original_firstorder_Energy             | Original   | First Order Features |
| Feature                                      | Original | First | Order |
|----------------------------------------------|----------|-------|-------|
| `original_firstorder_Entropy`               |          |       |       |
| `original_firstorder_InterquartileRange`    |          |       |       |
| `original_firstorder_Kurtosis`              |          |       |       |
| `original_firstorder_Maximum`               |          |       |       |
| `original_firstorder_MeanAbsoluteDeviation` |          |       |       |
| `original_firstorder_Mean`                  |          |       |       |
| `original_firstorder_Median`                |          |       |       |
| `original_firstorder_Minimum`               |          |       |       |
| `original_firstorder_Range`                 |          |       |       |
| `original_firstorder_RobustMeanAbsoluteDeviation` |         |       |       |
| `original_firstorder_RootMeanSquared`       |          |       |       |
| `original_firstorder_Skewness`              |          |       |       |
| `original_firstorder_TotalEnergy`           |          |       |       |
| `original_firstorder_Uniformity`            |          |       |       |
| `original_firstorder_Variance`              |          |       |       |
| Feature Name                     | Original | Texture Features--GLCM |
|----------------------------------|----------|------------------------|
| original_glcm_Autocorrelation    |          |                        |
| original_glcm_JointAverage       |          |                        |
| original_glcm_ClusterProminence  |          |                        |
| original_glcm_ClusterShade       |          |                        |
| original_glcm_ClusterTendency    |          |                        |
| original_glcm_Contrast           |          |                        |
| original_glcm_Correlation        |          |                        |
| original_glcm_DifferenceAverage  |          |                        |
| original_glcm_DifferenceEntropy  |          |                        |
| original_glcm_DifferenceVariance |          |                        |
| original_glcm_JointEnergy        |          |                        |
| original_glcm_JointEntropy       |          |                        |
| original_glcm_Imc1               |          |                        |
| original_glcm_Imc2               |          |                        |
| original_glcm_Idm                |          |                        |
| Feature Name                                      | Type         | Description                      |
|-------------------------------------------------|--------------|----------------------------------|
| original_glcml_Idmn                             | Original     | Texture Features--GLCM           |
| original_glcml_Id                               | Original     | Texture Features--GLCM           |
| original_glcml_Idn                              | Original     | Texture Features--GLCM           |
| original_glcml_InverseVariance                   | Original     | Texture Features--GLCM           |
| original_glcml_MaximumProbability                | Original     | Texture Features--GLCM           |
| original_glcml_SumEntropy                        | Original     | Texture Features--GLCM           |
| original_glcml_SumSquares                        | Original     | Texture Features--GLCM           |
| original_glrml_GrayLevelNonUniformity            | Original     | Texture Features--GLRLM          |
| original_glrml_GrayLevelNonUniformityNormalized  | Original     | Texture Features--GLRLM          |
| original_glrml_GrayLevelVariance                 | Original     | Texture Features--GLRLM          |
| original_glrml_HighGrayLevelRunEmphasis          | Original     | Texture Features--GLRLM          |
| original_glrml_LongRunEmphasis                   | Original     | Texture Features--GLRLM          |
| original_glrml_LongRunHighGrayLevelEmphasis     | Original     | Texture Features--GLRLM          |
| Feature Name                                | Type    | Description                          |
|--------------------------------------------|---------|--------------------------------------|
| original_glrlm_LongRunLowGrayLevelEmphasis | Original| Texture Features-- GLRLM             |
| original_glrlm_LowGrayLevelRunEmphasis     | Original| Texture Features-- GLRLM             |
| original_glrlm_RunEntropy                  | Original| Texture Features-- GLRLM             |
| original_glrlm_RunLengthNonUniformity      | Original| Texture Features-- GLRLM             |
| original_glrlm_RunLengthNonUniformityNormalized | Original| Texture Features-- GLRLM             |
| original_glrlm_RunPercentage               | Original| Texture Features-- GLRLM             |
| original_glrlm_RunVariance                 | Original| Texture Features-- GLRLM             |
| original_glrlm_ShortRunEmphasis            | Original| Texture Features-- GLRLM             |
| original_glrlm_ShortRunHighGrayLevelEmphasis | Original| Texture Features-- GLRLM             |
| original_glrlm_ShortRunLowGrayLevelEmphasis | Original| Texture Features-- GLRLM             |
| original_glszm_GrayLevelNonUniformity      | Original| Texture Features-- GLSZM             |
| original_glszm_GrayLevelNonUniformityNormalized | Original| Texture Features-- GLSZM             |
| Feature Name                                | Type    | Description                  |
|---------------------------------------------|---------|------------------------------|
| original_glszm_GrayLevelVariance            | Original| Texture Features--GLSZM      |
| original_glszm_HighGrayLevelZoneEmphasis   | Original| Texture Features--GLSZM      |
| original_glszm_LargeAreaEmphasis            | Original| Texture Features--GLSZM      |
| original_glszm_LargeAreaHighGrayLevelEmphasis | Original | Texture Features--GLSZM  |
| original_glszm_LargeAreaLowGrayLevelEmphasis | Original | Texture Features--GLSZM  |
| original_glszm_LowGrayLevelZoneEmphasis     | Original| Texture Features--GLSZM      |
| original_glszm_SizeZoneNonUniformity        | Original| Texture Features--GLSZM      |
| original_glszm_SizeZoneNonUniformityNormalized | Original | Texture Features--GLSZM  |
| original_glszm_SmallAreaEmphasis            | Original| Texture Features--GLSZM      |
| original_glszm_SmallAreaHighGrayLevelEmphasis | Original | Texture Features--GLSZM  |
| original_glszm_SmallAreaLowGrayLevelEmphasis | Original | Texture Features--GLSZM  |
| original_glszm_ZoneEntropy                  | Original| Texture Features--           |
| Feature Name                       | Type      | Description                                      |
|-----------------------------------|-----------|--------------------------------------------------|
| original_glszm_ZonePercentage     | Original  | Texture Features--GLSZM                          |
| original_glszm_ZoneVariance       | Original  | Texture Features--GLSZM                          |
| original_gldm_DependenceEntropy   | Original  | Texture Features--GLDM                           |
| original_gldm_DependenceNonUniformity | Original | Texture Features--GLDM                          |
| original_gldm_DependenceNonUniformityNormalized | Original | Texture Features--GLDM                          |
| original_gldm_DependenceVariance  | Original  | Texture Features--GLDM                           |
| original_gldm_GrayLevelNonUniformity | Original | Texture Features--GLDM                          |
| original_gldm_GrayLevelVariance   | Original  | Texture Features--GLDM                           |
| original_gldm_HighGrayLevelEmphasis | Original | Texture Features--GLDM                          |
| original_gldm_LargeDependenceEmphasis | Original | Texture Features--GLDM                          |
| original_gldm_LargeDependenceHighGrayLevelEmphasis | Original | Texture Features--GLDM                          |
| original_gldm_LargeDependenceLowGrayLevelEmphasis | Original | Texture Features--GLDM                          |
| Feature Name                                      | Type      | Description                  |
|--------------------------------------------------|-----------|------------------------------|
| `original_gldm_LowGrayLevelEmphasis`             | Original  | Texture Features--GLDM       |
| `original_gldm_SmallDependenceEmphasis`          | Original  | Texture Features--GLDM       |
| `original_gldm_SmallDependenceHighGrayLevelEmphasis` | Original  | Texture Features--GLDM       |
| `original_gldm_SmallDependenceLowGrayLevelEmphasis` | Original  | Texture Features--GLDM       |
| `original_ngtdm_Busyness`                        | Original  | Texture Features--NGTDM      |
| `original_ngtdm_Coarseness`                      | Original  | Texture Features--NGTDM      |
| `original_ngtdm_Complexity`                      | Original  | Texture Features--NGTDM      |
| `original_ngtdm_Contrast`                        | Original  | Texture Features--NGTDM      |
| `original_ngtdm_Strength`                        | Original  | Texture Features--NGTDM      |
| `log_sigma_1mm_3D_firstorder_10Percentile`       | Laplacian | First Order Features         |
| `log_sigma_1mm_3D_firstorder_90Percentile`       | Laplacian | First Order Features         |
| `log_sigma_1mm_3D_firstorder_Energy`             | Laplacian | First Order Features         |
| Feature Name | Derivative   | Order |
|-------------|-------------|-------|
| log_sigma_1mm_3D_firstorder_Entropy | Laplacian | First Order |
| log_sigma_1mm_3D_firstorder_InterquartileRange | Laplacian | First Order |
| log_sigma_1mm_3D_firstorder_Kurtosis | Laplacian | First Order |
| log_sigma_1mm_3D_firstorder_Maximum | Laplacian | First Order |
| log_sigma_1mm_3D_firstorder_MeanAbsoluteDeviation | Laplacian | First Order |
| log_sigma_1mm_3D_firstorder_Mean | Laplacian | First Order |
| log_sigma_1mm_3D_firstorder_Median | Laplacian | First Order |
| log_sigma_1mm_3D_firstorder_Minimum | Laplacian | First Order |
| log_sigma_1mm_3D_firstorder_Range | Laplacian | First Order |
| log_sigma_1mm_3D_firstorder_RobustMeanAbsoluteDeviation | Laplacian | First Order |
| log_sigma_1mm_3D_firstorder_RootMeanSquared | Laplacian | First Order |
| log_sigma_1mm_3D_firstorder_Skewness | Laplacian | First Order |
| log_sigma_1mm_3D_firstorder_TotalEnergy | Laplacian | First Order |
| log_sigma_1mm_3D_firstorder_Uniformity | Laplacian | First Order |
| log_sigma_1mm_3D_firstorder_Variance | Laplacian | First Order |
| Feature Name                                                                 | Domain   | Type     |
|----------------------------------------------------------------------------|----------|----------|
| log_sigma_1mm_3D_glcmlm_Autocorrelation                                   | Laplacian| Texture  |
| log_sigma_1mm_3D_glcmlm_JointAverage                                       | Laplacian| Texture  |
| log_sigma_1mm_3D_glcmlm_ClusterProminence                                 | Laplacian| Texture  |
| log_sigma_1mm_3D_glcmlm_ClusterShade                                      | Laplacian| Texture  |
| log_sigma_1mm_3D_glcmlm_ClusterTendency                                   | Laplacian| Texture  |
| log_sigma_1mm_3D_glcmlm_Contrast                                          | Laplacian| Texture  |
| log_sigma_1mm_3D_glcmlm_Correlation                                       | Laplacian| Texture  |
| log_sigma_1mm_3D_glcmlm_DifferenceAverage                                  | Laplacian| Texture  |
| log_sigma_1mm_3D_glcmlm_DifferenceEntropy                                 | Laplacian| Texture  |
| log_sigma_1mm_3D_glcmlm_DifferenceVariance                                | Laplacian| Texture  |
| log_sigma_1mm_3D_glcmlm_JointEnergy                                        | Laplacian| Texture  |
| log_sigma_1mm_3D_glcmlm_JointEntropy                                      | Laplacian| Texture  |
| log_sigma_1mm_3D_glcmlm_Lmc1                                               | Laplacian| Texture  |
| log_sigma_1mm_3D_glcmlm_Lmc2                                               | Laplacian| Texture  |
| log_sigma_1mm_3D_glcmlm_Idm                                                | Laplacian| Texture  |
| Feature Name                                      | Method       | Type            |
|--------------------------------------------------|--------------|-----------------|
| log_sigma_1mm_3D_glcm_Idmn                       | Laplacian    | Texture Features--GLCM |
| log_sigma_1mm_3D_glcm_Id                         | Laplacian    | Texture Features--GLCM |
| log_sigma_1mm_3D_glcm_Idn                       | Laplacian    | Texture Features--GLCM |
| log_sigma_1mm_3D_glcm_InverseVariance            | Laplacian    | Texture Features--GLCM |
| log_sigma_1mm_3D_glcm_MaximumProbability         | Laplacian    | Texture Features--GLCM |
| log_sigma_1mm_3D_glcm_SumEntropy                 | Laplacian    | Texture Features--GLCM |
| log_sigma_1mm_3D_glcm_SumSquares                 | Laplacian    | Texture Features--GLCM |
| log_sigma_1mm_3D_grlm_GrayLevelNonUniformity     | Laplacian    | Texture Features--GLRLM |
| log_sigma_1mm_3D_grlm_GrayLevelNonUniformityNormalized | Laplacian    | Texture Features--GLRLM |
| log_sigma_1mm_3D_grlm_GrayLevelVariance          | Laplacian    | Texture Features--GLRLM |
| log_sigma_1mm_3D_grlm_HighGrayLevelRunEmphasis   | Laplacian    | Texture Features--GLRLM |
| log_sigma_1mm_3D_grlm_LongRunEmphasis            | Laplacian    | Texture Features--GLRLM |
| log_sigma_1mm_3D_grlm_LongRunHighGrayLevelEmphasis | Laplacian    | Texture Features--GLRLM |
| log_sigma_1mm_3D_grlm_LongRunLowGrayLevelEmphasis | Laplacian    | Texture Features--
| Feature Name                                  | Method       | Texture Features-- |
|----------------------------------------------|--------------|--------------------|
| log_sigma_1mm_3D_glrIml_LowGrayLevelRunEmphasis | Laplacian    | GLRLM              |
| log_sigma_1mm_3D_glrIml_RunEntropy           | Laplacian    | GLRLM              |
| log_sigma_1mm_3D_glrIml_RunLengthNonUniformity | Laplacian    | GLRLM              |
| log_sigma_1mm_3D_glrIml_RunLengthNonUniformityNormalized | Laplacian    | GLRLM              |
| log_sigma_1mm_3D_glrIml_RunPercentage        | Laplacian    | GLRLM              |
| log_sigma_1mm_3D_glrIml_RunVariance          | Laplacian    | GLRLM              |
| log_sigma_1mm_3D_glrIml_ShortRunEmphasis     | Laplacian    | GLRLM              |
| log_sigma_1mm_3D_glrIml_ShortRunHighGrayLevelEmphasis | Laplacian    | GLRLM              |
| log_sigma_1mm_3D_glrIml_ShortRunLowGrayLevelEmphasis | Laplacian    | GLRLM              |
| log_sigma_1mm_3D_glszm_GrayLevelNonUniformity | Laplacian    | GLSIZM             |
| log_sigma_1mm_3D_glszm_GrayLevelNonUniformityNormalized | Laplacian    | GLSIZM             |
| Feature Name                                             | Type       | Description                     |
|----------------------------------------------------------|------------|---------------------------------|
| log_sigma_1mm_3D_glszm_GrayLevelVariance                | Laplacian  | Texture features -- GLSZM       |
| log_sigma_1mm_3D_glszm_HighGrayLevelZoneEmphasis       | Laplacian  | Texture features -- GLSZM       |
| log_sigma_1mm_3D_glszm_LargeAreaEmphasis               | Laplacian  | Texture features -- GLSZM       |
| log_sigma_1mm_3D_glszm_LargeAreaHighGrayLevelEmphasis  | Laplacian  | Texture features -- GLSZM       |
| log_sigma_1mm_3D_glszm_LargeAreaLowGrayLevelEmphasis   | Laplacian  | Texture features -- GLSZM       |
| log_sigma_1mm_3D_glszm_LowGrayLevelZoneEmphasis        | Laplacian  | Texture features -- GLSZM       |
| log_sigma_1mm_3D_glszm_SizeZoneNonUniformity           | Laplacian  | Texture features -- GLSZM       |
| log_sigma_1mm_3D_glszm_SizeZoneNonUniformityNormalized | Laplacian  | Texture features -- GLSZM       |
| log_sigma_1mm_3D_glszm_SmallAreaEmphasis               | Laplacian  | Texture features -- GLSZM       |
| log_sigma_1mm_3D_glszm_SmallAreaHighGrayLevelEmphasis  | Laplacian  | Texture features -- GLSZM       |
| log_sigma_1mm_3D_glszm_SmallAreaLowGrayLevelEmphasis   | Laplacian  | Texture features -- GLSZM       |
| log_sigma_1mm_3D_glszm_ZoneEntropy                      | Laplacian  | Texture features -- GLSZM       |
| Feature Name                                      | Texture Features | Description                          |
|--------------------------------------------------|------------------|--------------------------------------|
| log_sigma_1mm_3D_glszm_ZonePercentage            | Laplacian        | GLSZM                                |
| log_sigma_1mm_3D_glszm_ZoneVariance             | Laplacian        | GLSZM                                |
| log_sigma_1mm_3D_gldm_DependenceEntropy         | Laplacian        | GLDM                                 |
| log_sigma_1mm_3D_gldm_DependenceNonUniformity   | Laplacian        | GLDM                                 |
| log_sigma_1mm_3D_gldm_DependenceNonUniformityNormalized | Laplacian        | GLDM                                 |
| log_sigma_1mm_3D_gldm_DependenceVariance        | Laplacian        | GLDM                                 |
| log_sigma_1mm_3D_gldm_GrayLevelNonUniformity    | Laplacian        | GLDM                                 |
| log_sigma_1mm_3D_gldm_GrayLevelVariance         | Laplacian        | GLDM                                 |
| log_sigma_1mm_3D_gldm_HighGrayLevelEmphasis    | Laplacian        | GLDM                                 |
| log_sigma_1mm_3D_gldm_LargeDependenceEmphasis   | Laplacian        | GLDM                                 |
| log_sigma_1mm_3D_gldm_LargeDependenceHighGrayLevelEmphasis | Laplacian        | GLDM                                 |
| log_sigma_1mm_3D_gldm_LargeDependenceLowGrayLevelEmphasis | Laplacian | GLDM                                 |
| Feature Name                                                      | Feature Type | Feature Type Details |
|-----------------------------------------------------------------|--------------|----------------------|
| log_sigma_1mm_3D_gldm_LowGrayLevelEmphasis                     | Laplacian    | GLDM                 |
| log_sigma_1mm_3D_gldm_SmallDependenceEmphasis                  | Laplacian    | GLDM                 |
| log_sigma_1mm_3D_gldm_SmallDependenceHighGrayLevelEmphasis    | Laplacian    | GLDM                 |
| log_sigma_1mm_3D_gldm_SmallDependenceLowGrayLevelEmphasis     | Laplacian    | GLDM                 |
| log_sigma_1mm_3D_ngtdm_Busyness                                | Laplacian    | NGTDM                |
| log_sigma_1mm_3D_ngtdm_Coarseness                              | Laplacian    | NGTDM                |
| log_sigma_1mm_3D_ngtdm_Complexity                              | Laplacian    | NGTDM                |
| log_sigma_1mm_3D_ngtdm_Contrast                                | Laplacian    | NGTDM                |
| log_sigma_1mm_3D_ngtdm_Strength                                | Laplacian    | NGTDM                |
| log_sigma_2mm_3D_firstorder_10Percentile                       | Laplacian    | First Order Features |
| log_sigma_2mm_3D_firstorder_90Percentile                       | Laplacian    | First Order Features |
| log_sigma_2mm_3D_firstorder_Energy                             | Laplacian    | First Order Features |
| Feature                                           | Type         | Order       |
|---------------------------------------------------|--------------|-------------|
| log_sigma_2mm_3D_firstorder_Entropy               | Laplacian    | First Order |
| log_sigma_2mm_3D_firstorder_InterquartileRange    | Laplacian    | First Order |
| log_sigma_2mm_3D_firstorder_Kurtosis              | Laplacian    | First Order |
| log_sigma_2mm_3D_firstorder_Maximum               | Laplacian    | First Order |
| log_sigma_2mm_3D_firstorder_MeanAbsoluteDeviation| Laplacian    | First Order |
| log_sigma_2mm_3D_firstorder_Mean                  | Laplacian    | First Order |
| log_sigma_2mm_3D_firstorder_Median                | Laplacian    | First Order |
| log_sigma_2mm_3D_firstorder_Minimum               | Laplacian    | First Order |
| log_sigma_2mm_3D_firstorder_Range                 | Laplacian    | First Order |
| log_sigma_2mm_3D_firstorder_RobustMeanAbsoluteDeviation| Laplacian    | First Order |
| log_sigma_2mm_3D_firstorder_RootMeanSquared       | Laplacian    | First Order |
| log_sigma_2mm_3D_firstorder_Skewness               | Laplacian    | First Order |
| log_sigma_2mm_3D_firstorder_TotalEnergy           | Laplacian    | First Order |
| log_sigma_2mm_3D_firstorder_Uniformity            | Laplacian    | First Order |
| log_sigma_2mm_3D_firstorder_Variance              | Laplacian    | First Order |
| Feature Name                                      | Filter Type | Description            |
|--------------------------------------------------|-------------|------------------------|
| log_sigma_2mm_3D_glcm_Autocorrelation             | Laplacian   | Texture Features--GLCM |
| log_sigma_2mm_3D_glcm_JointAverage               | Laplacian   | Texture Features--GLCM |
| log_sigma_2mm_3D_glcm_ClusterProminence          | Laplacian   | Texture Features--GLCM |
| log_sigma_2mm_3D_glcm_ClusterShade               | Laplacian   | Texture Features--GLCM |
| log_sigma_2mm_3D_glcm_ClusterTendency            | Laplacian   | Texture Features--GLCM |
| log_sigma_2mm_3D_glcm_Contrast                   | Laplacian   | Texture Features--GLCM |
| log_sigma_2mm_3D_glcm_Correlation                | Laplacian   | Texture Features--GLCM |
| log_sigma_2mm_3D_glcm_DifferenceAverage          | Laplacian   | Texture Features--GLCM |
| log_sigma_2mm_3D_glcm_DifferenceEntropy          | Laplacian   | Texture Features--GLCM |
| log_sigma_2mm_3D_glcm_DifferenceVariance         | Laplacian   | Texture Features--GLCM |
| log_sigma_2mm_3D_glcm_JointEnergy                | Laplacian   | Texture Features--GLCM |
| log_sigma_2mm_3D_glcm_JointEntropy               | Laplacian   | Texture Features--GLCM |
| log_sigma_2mm_3D_glcm_Imc1                       | Laplacian   | Texture Features--GLCM |
| log_sigma_2mm_3D_glcm_Imc2                       | Laplacian   | Texture Features--GLCM |
| log_sigma_2mm_3D_glcm_Idm                        | Laplacian   | Texture Features--GLCM |
| Feature Name                             | Feature Type | Description                        |
|------------------------------------------|--------------|------------------------------------|
| log_sigma_2mm_3D_glcm_Idmn              | Laplacian    | Texture Features--GLCM             |
| log_sigma_2mm_3D_glcm_Id                | Laplacian    | Texture Features--GLCM             |
| log_sigma_2mm_3D_glcm_Idn               | Laplacian    | Texture Features--GLCM             |
| log_sigma_2mm_3D_glcm_InverseVariance   | Laplacian    | Texture Features--GLCM             |
| log_sigma_2mm_3D_glcm_MaximumProbability| Laplacian    | Texture Features--GLCM             |
| log_sigma_2mm_3D_glcm_SumEntropy        | Laplacian    | Texture Features--GLCM             |
| log_sigma_2mm_3D_glcm_SumSquares        | Laplacian    | Texture Features--GLCM             |
| log_sigma_2mm_3D_glrIm_GrayLevelNonUniformity| Laplacian      | Texture Features--GLRLM           |
| log_sigma_2mm_3D_glrIm_GrayLevelNonUniformityNormalized| Laplacian | Texture Features--GLRLM |
| log_sigma_2mm_3D_glrIm_GrayLevelVariance | Laplacian    | Texture Features--GLRLM           |
| log_sigma_2mm_3D_glrIm_HighGrayLevelRunEmphasis | Laplacian     | Texture Features--GLRLM         |
| log_sigma_2mm_3D_glrIm_LongRunEmphasis  | Laplacian    | Texture Features--GLRLM           |
| log_sigma_2mm_3D_glrIm_LongRunHighGrayLevelEmphasis | Laplacian  | Texture Features--GLRLM |
| Feature Name                                                                 | Function | Texture Features |
|----------------------------------------------------------------------------|----------|------------------|
| log_sigma_2mm_3D_glrlm_LongRunLowGrayLevelEmphasis                         | Laplacian| GLRLM            |
| log_sigma_2mm_3D_glrlm_LowGrayLevelRunEmphasis                             | Laplacian| GLRLM            |
| log_sigma_2mm_3D_glrlm_RunEntropy                                           | Laplacian| GLRLM            |
| log_sigma_2mm_3D_glrlm_RunLengthNonUniformity                              | Laplacian| GLRLM            |
| log_sigma_2mm_3D_glrlm_RunLengthNonUniformityNormalized                    | Laplacian| GLRLM            |
| log_sigma_2mm_3D_glrlm_RunPercentage                                        | Laplacian| GLRLM            |
| log_sigma_2mm_3D_glrlm_RunVariance                                          | Laplacian| GLRLM            |
| log_sigma_2mm_3D_glrlm_ShortRunEmphasis                                    | Laplacian| GLRLM            |
| log_sigma_2mm_3D_glrlm_ShortRunHighGrayLevelEmphasis                       | Laplacian| GLRLM            |
| log_sigma_2mm_3D_glrlm_ShortRunLowGrayLevelEmphasis                        | Laplacian| GLRLM            |
| log_sigma_2mm_3D_glszm_GrayLevelNonUniformity                              | Laplacian| GLSZM            |
| log_sigma_2mm_3D_glszm_GrayLevelNonUniformityNormalized                    | Laplacian| GLSZM            |
| Feature Name                                      | Feature Type | Texture Features--GLSZM |
|-------------------------------------------------|--------------|------------------------|
| \textit{log\_sigma\_2mm\_3D\_glszm\_GrayLevelVariance} | Laplacian    |                        |
| \textit{log\_sigma\_2mm\_3D\_glszm\_HighGrayLevelZoneEmphasis} | Laplacian    |                        |
| \textit{log\_sigma\_2mm\_3D\_glszm\_LargeAreaEmphasis}       | Laplacian    |                        |
| \textit{log\_sigma\_2mm\_3D\_glszm\_LargeAreaHighGrayLevelEmphasis} | Laplacian    |                        |
| \textit{log\_sigma\_2mm\_3D\_glszm\_LargeAreaLowGrayLevelEmphasis} | Laplacian    |                        |
| \textit{log\_sigma\_2mm\_3D\_glszm\_LowGrayLevelZoneEmphasis}       | Laplacian    |                        |
| \textit{log\_sigma\_2mm\_3D\_glszm\_SizeZoneNonUniformity}         | Laplacian    |                        |
| \textit{log\_sigma\_2mm\_3D\_glszm\_SizeZoneNonUniformityNormalized} | Laplacian    |                        |
| \textit{log\_sigma\_2mm\_3D\_glszm\_SmallAreaEmphasis}            | Laplacian    |                        |
| \textit{log\_sigma\_2mm\_3D\_glszm\_SmallAreaHighGrayLevelEmphasis} | Laplacian    |                        |
| \textit{log\_sigma\_2mm\_3D\_glszm\_SmallAreaLowGrayLevelEmphasis} | Laplacian    |                        |
| \textit{log\_sigma\_2mm\_3D\_glszm\_ZoneEntropy}                  | Laplacian    |                        |
| Feature Name                        | Method     | Texture Features | Library  |
|------------------------------------|------------|------------------|----------|
| log_sigma_2mm_3D_glszm_ZonePercentage | Laplacian  | Texture Features--  | GLSZM    |
| log_sigma_2mm_3D_glszm_ZoneVariance | Laplacian  | Texture Features--  | GLSZM    |
| log_sigma_2mm_3D_gldm_DependenceEntropy | Laplacian  | Texture Features--  | GLDM     |
| log_sigma_2mm_3D_gldm_DependenceNonUniformity | Laplacian  | Texture Features--  | GLDM     |
| log_sigma_2mm_3D_gldm_DependenceNonUniformityNormalized | Laplacian  | Texture Features--  | GLDM     |
| log_sigma_2mm_3D_gldm_DependenceVariance | Laplacian  | Texture Features--  | GLDM     |
| log_sigma_2mm_3D_gldm_GrayLevelNonUniformity | Laplacian  | Texture Features--  | GLDM     |
| log_sigma_2mm_3D_gldm_GrayLevelVariance | Laplacian  | Texture Features--  | GLDM     |
| log_sigma_2mm_3D_gldm_HighGrayLevelEmphasis | Laplacian  | Texture Features--  | GLDM     |
| log_sigma_2mm_3D_gldm_LargeDependenceEmphasis | Laplacian  | Texture Features--  | GLDM     |
| log_sigma_2mm_3D_gldm_LargeDependenceHighGrayLevelEmphasis | Laplacian  | Texture Features--  | GLDM     |
| log_sigma_2mm_3D_gldm_LargeDependenceLowGrayLevelEmphasis | Laplacian  | Texture Features--  | --       |
| Feature Name                                                   | Measure | Texture Features | Method         |
|---------------------------------------------------------------|---------|------------------|----------------|
| log_sigma_2mm_3D_gldm_LowGrayLevelEmphasis                   | Laplacian| GLDM             | GLDM           |
| log_sigma_2mm_3D_gldm_SmallDependenceEmphasis                | Laplacian| GLDM             | GLDM           |
| log_sigma_2mm_3D_gldm_SmallDependenceHighGrayLevelEmphasis  | Laplacian| GLDM             | GLDM           |
| log_sigma_2mm_3D_gldm_SmallDependenceLowGrayLevelEmphasis    | Laplacian| GLDM             | GLDM           |
| log_sigma_2mm_3D_ngtdm_Busyness                               | Laplacian| NGTDM            | NGTDM          |
| log_sigma_2mm_3D_ngtdm_Coarseness                            | Laplacian| NGTDM            | NGTDM          |
| log_sigma_2mm_3D_ngtdm_Complexity                             | Laplacian| NGTDM            | NGTDM          |
| log_sigma_2mm_3D_ngtdm_Contrast                               | Laplacian| NGTDM            | NGTDM          |
| log_sigma_2mm_3D_ngtdm_Strength                               | Laplacian| NGTDM            | NGTDM          |
| log_sigma_3mm_3D_firstorder_10Percentile                      | Laplacian| First Order      | First Order    |
| log_sigma_3mm_3D_firstorder_90Percentile                      | Laplacian| First Order      | First Order    |
| log_sigma_3mm_3D_firstorder_Energy                            | Laplacian| First Order      | First Order    |
| Feature Name                                               | Operator          | Order  |
|-----------------------------------------------------------|-------------------|--------|
| log_sigma_3mm_3D_firstorder_Entropy                       | Laplacian         | First   |
| log_sigma_3mm_3D_firstorder_InterquartileRange            | Laplacian         | First   |
| log_sigma_3mm_3D_firstorder_Kurtosis                      | Laplacian         | First   |
| log_sigma_3mm_3D_firstorder_Maximum                       | Laplacian         | First   |
| log_sigma_3mm_3D_firstorder_MeanAbsoluteDeviation        | Laplacian         | First   |
| log_sigma_3mm_3D_firstorder_Mean                          | Laplacian         | First   |
| log_sigma_3mm_3D_firstorder_Median                        | Laplacian         | First   |
| log_sigma_3mm_3D_firstorder_Minimum                       | Laplacian         | First   |
| log_sigma_3mm_3D_firstorder_Range                         | Laplacian         | First   |
| log_sigma_3mm_3D_firstorder_RobustMeanAbsoluteDeviation  | Laplacian         | First   |
| log_sigma_3mm_3D_firstorder_RootMeanSquared               | Laplacian         | First   |
| log_sigma_3mm_3D_firstorder_Skewness                      | Laplacian         | First   |
| log_sigma_3mm_3D_firstorder_TotalEnergy                   | Laplacian         | First   |
| log_sigma_3mm_3D_firstorder_Uniformity                    | Laplacian         | First   |
| log_sigma_3mm_3D_firstorder_Variance                      | Laplacian         | First   |
| Feature Name                                      | Method     | Feature Type |
|--------------------------------------------------|------------|--------------|
| log_sigma_3mm_3D_glcm_Autocorrelation            | Laplacian  | Texture      |
| log_sigma_3mm_3D_glcm_JointAverage               | Laplacian  | Texture      |
| log_sigma_3mm_3D_glcm_ClusterProminence          | Laplacian  | Texture      |
| log_sigma_3mm_3D_glcm_ClusterShade               | Laplacian  | Texture      |
| log_sigma_3mm_3D_glcm_ClusterTendency            | Laplacian  | Texture      |
| log_sigma_3mm_3D_glcm_Contrast                   | Laplacian  | Texture      |
| log_sigma_3mm_3D_glcm_Correlation                | Laplacian  | Texture      |
| log_sigma_3mm_3D_glcm_DifferenceAverage          | Laplacian  | Texture      |
| log_sigma_3mm_3D_glcm_DifferenceEntropy          | Laplacian  | Texture      |
| log_sigma_3mm_3D_glcm_DifferenceVariance         | Laplacian  | Texture      |
| log_sigma_3mm_3D_glcm_JointEnergy                | Laplacian  | Texture      |
| log_sigma_3mm_3D_glcm_JointEntropy               | Laplacian  | Texture      |
| log_sigma_3mm_3D_glcm_Imc1                        | Laplacian  | Texture      |
| log_sigma_3mm_3D_glcm_Imc2                        | Laplacian  | Texture      |
| log_sigma_3mm_3D_glcm_Idm                         | Laplacian  | Texture      |
| Feature Description                                                      | Type     | Feature Type |
|------------------------------------------------------------------------|----------|--------------|
| log_sigma_3mm_3D_glcm_Idmn                                            | Laplacian| Texture--GLCM|
| log_sigma_3mm_3D_glcm_Id                                              | Laplacian| Texture--GLCM|
| log_sigma_3mm_3D_glcm_Idn                                             | Laplacian| Texture--GLCM|
| log_sigma_3mm_3D_glcm_InverseVariance                                  | Laplacian| Texture--GLCM|
| log_sigma_3mm_3D_glcm_MaximumProbability                               | Laplacian| Texture--GLCM|
| log_sigma_3mm_3D_glcm_SumEntropy                                      | Laplacian| Texture--GLCM|
| log_sigma_3mm_3D_glcm_SumSquares                                      | Laplacian| Texture--GLCM|
| log_sigma_3mm_3D_glrlm_GrayLevelNonUniformity                          | Laplacian| Texture--GLRLM|
| log_sigma_3mm_3D_glrlm_GrayLevelNonUniformityNormalized               | Laplacian| Texture--GLRLM|
| log_sigma_3mm_3D_glrlm_GrayLevelVariance                              | Laplacian| Texture--GLRLM|
| log_sigma_3mm_3D_glrlm_HighGrayLevelRunEmphasis                       | Laplacian| Texture--GLRLM|
| log_sigma_3mm_3D_glrlm_LongRunEmphasis                                 | Laplacian| Texture--GLRLM|
| log_sigma_3mm_3D_glrlm_LongRunHighGrayLevelEmphasis                   | Laplacian| Texture--GLRLM|
| log_sigma_3mm_3D_glrlm_LongRunLowGrayLevelEmphasis                    | Laplacian| Texture--GLRLM|
| Feature Name | Method | Texture Features | Texture Analyzer |
|--------------|--------|------------------|------------------|
| log_sigma_3mm_3D_glrLm_LowGrayLevelRunEmphasis | Laplacian | GLRLM | GLRLM |
| log_sigma_3mm_3D_glrLm_RunEntropy | Laplacian | GLRLM | GLRLM |
| log_sigma_3mm_3D_glrLm_RunLengthNonUniformity | Laplacian | GLRLM | GLRLM |
| log_sigma_3mm_3D_glrLm_RunLengthNonUniformityNormalized | Laplacian | GLRLM | GLRLM |
| log_sigma_3mm_3D_glrLm_RunPercentage | Laplacian | GLRLM | GLRLM |
| log_sigma_3mm_3D_glrLm_RunVariance | Laplacian | GLRLM | GLRLM |
| log_sigma_3mm_3D_glrLm_ShortRunEmphasis | Laplacian | GLRLM | GLRLM |
| log_sigma_3mm_3D_glrLm_ShortRunHighGrayLevelEmphasis | Laplacian | GLRLM | GLRLM |
| log_sigma_3mm_3D_glrLm_ShortRunLowGrayLevelEmphasis | Laplacian | GLRLM | GLRLM |
| log_sigma_3mm_3D_glszm_GrayLevelNonUniformity | Laplacian | GLSZM | GLSZM |
| log_sigma_3mm_3D_glszm_GrayLevelNonUniformityNormalized | Laplacian | GLSZM | GLSZM |
| Feature Name                                                      | Method          | Feature Type          |
|------------------------------------------------------------------|-----------------|-----------------------|
| log_sigma_3mm_3D_glszm_GrayLevelVariance                         | Laplacian       | Texture               |
|                                                                  |                 | Features--            |
|                                                                  |                 | GLSZM                 |
| log_sigma_3mm_3D_glszm_HighGrayLevelZoneEmphasis                 | Laplacian       | Texture               |
|                                                                  |                 | Features--            |
|                                                                  |                 | GLSZM                 |
| log_sigma_3mm_3D_glszm_LargeAreaEmphasis                         | Laplacian       | Texture               |
|                                                                  |                 | Features--            |
|                                                                  |                 | GLSZM                 |
| log_sigma_3mm_3D_glszm_LargeAreaHighGrayLevelEmphasis            | Laplacian       | Texture               |
|                                                                  |                 | Features--            |
|                                                                  |                 | GLSZM                 |
| log_sigma_3mm_3D_glszm_LargeAreaLowGrayLevelEmphasis             | Laplacian       | Texture               |
|                                                                  |                 | Features--            |
|                                                                  |                 | GLSZM                 |
| log_sigma_3mm_3D_glszm_LowGrayLevelZoneEmphasis                  | Laplacian       | Texture               |
|                                                                  |                 | Features--            |
|                                                                  |                 | GLSZM                 |
| log_sigma_3mm_3D_glszm_SizeZoneNonUniformity                      | Laplacian       | Texture               |
|                                                                  |                 | Features--            |
|                                                                  |                 | GLSZM                 |
| log_sigma_3mm_3D_glszm_SizeZoneNonUniformityNormalized            | Laplacian       | Texture               |
|                                                                  |                 | Features--            |
|                                                                  |                 | GLSZM                 |
| log_sigma_3mm_3D_glszm_SmallAreaEmphasis                         | Laplacian       | Texture               |
|                                                                  |                 | Features--            |
|                                                                  |                 | GLSZM                 |
| log_sigma_3mm_3D_glszm_SmallAreaHighGrayLevelEmphasis            | Laplacian       | Texture               |
|                                                                  |                 | Features--            |
|                                                                  |                 | GLSZM                 |
| log_sigma_3mm_3D_glszm_SmallAreaLowGrayLevelEmphasis             | Laplacian       | Texture               |
|                                                                  |                 | Features--            |
|                                                                  |                 | GLSZM                 |
| log_sigma_3mm_3D_glszm_ZoneEntropy                                | Laplacian       | Texture               |
|                                                                  |                 | Features--            |
|                                                                  |                 | GLSZM                 |
| Feature Name                                                                 | Feature Family | Texture Features |
|----------------------------------------------------------------------------|----------------|------------------|
| log_sigma_3mm_3D_glszm_ZonePercentage                                      | Laplacian      | GLSZM            |
| log_sigma_3mm_3D_glszm_ZoneVariance                                        | Laplacian      | GLSZM            |
| log_sigma_3mm_3D_gldm_DependenceEntropy                                    | Laplacian      | GLDM             |
| log_sigma_3mm_3D_gldm_DependenceNonUniformity                              | Laplacian      | GLDM             |
| log_sigma_3mm_3D_gldm_DependenceNonUniformityNormalized                    | Laplacian      | GLDM             |
| log_sigma_3mm_3D_gldm_DependenceVariance                                   | Laplacian      | GLDM             |
| log_sigma_3mm_3D_gldm_GrayLevelNonUniformity                               | Laplacian      | GLDM             |
| log_sigma_3mm_3D_gldm_GrayLevelVariance                                    | Laplacian      | GLDM             |
| log_sigma_3mm_3D_gldm_HighGrayLevelEmphasis                               | Laplacian      | GLDM             |
| log_sigma_3mm_3D_gldm_LargeDependenceEmphasis                             | Laplacian      | GLDM             |
| log_sigma_3mm_3D_gldm_LargeDependenceHighGrayLevelEmphasis                | Laplacian      | GLDM             |
| log_sigma_3mm_3D_gldm_LargeDependenceLowGrayLevelEmphasis                 | Laplacian      | GLDM             |
| Feature Name                                                                 | Method       | Texture Features | GLDM          |
|------------------------------------------------------------------------------|--------------|------------------|---------------|
| log_sigma_3mm_3D_gldm_LowGrayLevelEmphasis                                 | Laplacian    |                  | GLDM          |
| log_sigma_3mm_3D_gldm_SmallDependenceEmphasis                               | Laplacian    |                  | GLDM          |
| log_sigma_3mm_3D_gldm_SmallDependenceHighGrayLevelEmphasis                | Laplacian    |                  | GLDM          |
| log_sigma_3mm_3D_gldm_SmallDependenceLowGrayLevelEmphasis                 | Laplacian    |                  | GLDM          |
| log_sigma_3mm_3D_ngtdm.Busyness                                            | Laplacian    |                  | NGTDM         |
| log_sigma_3mm_3D_ngtdm.Coarseness                                          | Laplacian    |                  | NGTDM         |
| log_sigma_3mm_3D_ngtdm.Complexity                                          | Laplacian    |                  | NGTDM         |
| log_sigma_3mm_3D_ngtdm.Contrast                                            | Laplacian    |                  | NGTDM         |
| log_sigma_3mm_3D_ngtdm.Strength                                             | Laplacian    |                  | NGTDM         |
| log_sigma_4mm_3D_firstorder_10Percentile                                   | Laplacian    |                  | First Order   |
| log_sigma_4mm_3D_firstorder_90Percentile                                   | Laplacian    |                  | First Order   |
| log_sigma_4mm_3D_firstorder_Energy                                          | Laplacian    |                  | First Order   |
| Feature                                      | Laplacian | First Order Features |
|----------------------------------------------|-----------|----------------------|
| log\_sigma\_4mm\_3D\_firstorder\_Entropy    |           |                      |
| log\_sigma\_4mm\_3D\_firstorder\_InterquartileRange |           |                      |
| log\_sigma\_4mm\_3D\_firstorder\_Kurtosis   |           |                      |
| log\_sigma\_4mm\_3D\_firstorder\_Maximum    |           |                      |
| log\_sigma\_4mm\_3D\_firstorder\_MeanAbsoluteDeviation |           |                      |
| log\_sigma\_4mm\_3D\_firstorder\_Mean      |           |                      |
| log\_sigma\_4mm\_3D\_firstorder\_Median    |           |                      |
| log\_sigma\_4mm\_3D\_firstorder\_Minimum   |           |                      |
| log\_sigma\_4mm\_3D\_firstorder\_Range     |           |                      |
| log\_sigma\_4mm\_3D\_firstorder\_RobustMeanAbsoluteDeviation |           |                      |
| log\_sigma\_4mm\_3D\_firstorder\_RootMeanSquared |           |                      |
| log\_sigma\_4mm\_3D\_firstorder\_Skewness  |           |                      |
| log\_sigma\_4mm\_3D\_firstorder\_TotalEnergy|           |                      |
| log\_sigma\_4mm\_3D\_firstorder\_Uniformity |           |                      |
| log\_sigma\_4mm\_3D\_firstorder\_Variance  |           |                      |
| Feature Name                                      | Method   | Description          |
|--------------------------------------------------|----------|----------------------|
| log_sigma_4mm_3D_glcm_Autocorrelation            | Laplacian| Texture Features--GLCM |
| log_sigma_4mm_3D_glcm_JointAverage               | Laplacian| Texture Features--GLCM |
| log_sigma_4mm_3D_glcm_ClusterProminence          | Laplacian| Texture Features--GLCM |
| log_sigma_4mm_3D_glcm_ClusterShade               | Laplacian| Texture Features--GLCM |
| log_sigma_4mm_3D_glcm_ClusterTendency            | Laplacian| Texture Features--GLCM |
| log_sigma_4mm_3D_glcm_Contrast                   | Laplacian| Texture Features--GLCM |
| log_sigma_4mm_3D_glcm_Correlation                | Laplacian| Texture Features--GLCM |
| log_sigma_4mm_3D_glcm_DifferenceAverage          | Laplacian| Texture Features--GLCM |
| log_sigma_4mm_3D_glcm_DifferenceEntropy          | Laplacian| Texture Features--GLCM |
| log_sigma_4mm_3D_glcm_DifferenceVariance         | Laplacian| Texture Features--GLCM |
| log_sigma_4mm_3D_glcm_JointEnergy                | Laplacian| Texture Features--GLCM |
| log_sigma_4mm_3D_glcm_JointEntropy               | Laplacian| Texture Features--GLCM |
| log_sigma_4mm_3D_glcm_Imc1                       | Laplacian| Texture Features--GLCM |
| log_sigma_4mm_3D_glcm_Imc2                       | Laplacian| Texture Features--GLCM |
| log_sigma_4mm_3D_glcm_Idm                        | Laplacian| Texture Features--GLCM |
| Feature Name                                      | Type       | Feature Type       |
|-------------------------------------------------|------------|--------------------|
| log_sigma_4mm_3D_glcm_Idmn                      | Laplacian  | Texture--GLCM      |
| log_sigma_4mm_3D_glcm_Id                        | Laplacian  | Texture--GLCM      |
| log_sigma_4mm_3D_glcm_Idn                       | Laplacian  | Texture--GLCM      |
| log_sigma_4mm_3D_glcm_InverseVariance           | Laplacian  | Texture--GLCM      |
| log_sigma_4mm_3D_glcm_MaximumProbability        | Laplacian  | Texture--GLCM      |
| log_sigma_4mm_3D_glcm_SumEntropy                | Laplacian  | Texture--GLCM      |
| log_sigma_4mm_3D_glcm_SumSquares                | Laplacian  | Texture--GLCM      |
| log_sigma_4mm_3D_grlm_GrayLevelNonUniformity    | Laplacian  | Texture--GLRLM     |
| log_sigma_4mm_3D_grlm_GrayLevelNonUniformityNormalized | Laplacian  | Texture--GLRLM     |
| log_sigma_4mm_3D_grlm_GrayLevelVariance         | Laplacian  | Texture--GLRLM     |
| log_sigma_4mm_3D_grlm_HighGrayLevelRunEmphasis  | Laplacian  | Texture--GLRLM     |
| log_sigma_4mm_3D_grlm_LongRunEmphasis           | Laplacian  | Texture--GLRLM     |
| log_sigma_4mm_3D_grlm_LongRunHighGrayLevelEmphasis | Laplacian  | Texture--GLRLM     |
| Descriptor                                                                 | Laplacian | Texture Features--GLRLM |
|---------------------------------------------------------------------------|-----------|------------------------|
| log_sigma_4mm_3D_glrIm_LongRunLowGrayLevelEmphasis                         |           |                        |
| log_sigma_4mm_3D_glrIm_LowGrayLevelRunEmphasis                            |           |                        |
| log_sigma_4mm_3D_glrIm_RunEntropy                                         |           |                        |
| log_sigma_4mm_3D_glrIm_RunLengthNonUniformity                             |           |                        |
| log_sigma_4mm_3D_glrIm_RunLengthNonUniformityNormalized                   |           |                        |
| log_sigma_4mm_3D_glrIm_RunPercentage                                      |           |                        |
| log_sigma_4mm_3D_glrIm_RunVariance                                        |           |                        |
| log_sigma_4mm_3D_glrIm_ShortRunEmphasis                                   |           |                        |
| log_sigma_4mm_3D_glrIm_ShortRunHighGrayLevelEmphasis                     |           |                        |
| log_sigma_4mm_3D_glrIm_ShortRunLowGrayLevelEmphasis                      |           |                        |
| log_sigma_4mm_3D_glszm_GrayLevelNonUniformity                            |           |                        |
| log_sigma_4mm_3D_glszm_GrayLevelNonUniformityNormalized                  |           |                        |
| Feature Name                                      | Feature Type | Description               |
|--------------------------------------------------|--------------|---------------------------|
| log_sigma_4mm_3D_glszm_GrayLevelVariance         | Laplacian    | Texture Features--GGLSZM  |
| log_sigma_4mm_3D_glszm_HighGrayLevelZoneEmphasis| Laplacian    | Texture Features--GGLSZM  |
| log_sigma_4mm_3D_glszm_LargeAreaEmphasis         | Laplacian    | Texture Features--GGLSZM  |
| log_sigma_4mm_3D_glszm_LargeAreaHighGrayLevelEmphasis| Laplacian | Texture Features--GGLSZM  |
| log_sigma_4mm_3D_glszm_LargeAreaLowGrayLevelEmphasis| Laplacian | Texture Features--GGLSZM  |
| log_sigma_4mm_3D_glszm_LowGrayLevelZoneEmphasis  | Laplacian    | Texture Features--GGLSZM  |
| log_sigma_4mm_3D_glszm_SizeZoneNonUniformity     | Laplacian    | Texture Features--GGLSZM  |
| log_sigma_4mm_3D_glszm_SizeZoneNonUniformityNormalized| Laplacian | Texture Features--GGLSZM  |
| log_sigma_4mm_3D_glszm_SmallAreaEmphasis         | Laplacian    | Texture Features--GGLSZM  |
| log_sigma_4mm_3D_glszm_SmallAreaHighGrayLevelEmphasis| Laplacian | Texture Features--GGLSZM  |
| log_sigma_4mm_3D_glszm_SmallAreaLowGrayLevelEmphasis| Laplacian | Texture Features--GGLSZM  |
| log_sigma_4mm_3D_glszm_ZoneEntropy               | Laplacian    | Texture Features--        |
| Feature Name                                      | Technique | Texture Features | Algorithm |
|--------------------------------------------------|-----------|------------------|-----------|
| log_sigma_4mm_3D_glszm_ZonePercentage            | Laplacian | GLSZM            | GLSZM     |
| log_sigma_4mm_3D_glszm_ZoneVariance              | Laplacian | GLSZM            | GLSZM     |
| log_sigma_4mm_3D_gldm_DependenceEntropy         | Laplacian | GLDM             | GLDM      |
| log_sigma_4mm_3D_gldm_DependenceNonUniformity   | Laplacian | GLDM             | GLDM      |
| log_sigma_4mm_3D_gldm_DependenceNonUniformityNormalized | Laplacian | GLDM             | GLDM      |
| log_sigma_4mm_3D_gldm_DependenceVariance        | Laplacian | GLDM             | GLDM      |
| log_sigma_4mm_3D_gldm_GrayLevelNonUniformity    | Laplacian | GLDM             | GLDM      |
| log_sigma_4mm_3D_gldm_GrayLevelVariance         | Laplacian | GLDM             | GLDM      |
| log_sigma_4mm_3D_gldm_HighGrayLevelEmphasis    | Laplacian | GLDM             | GLDM      |
| log_sigma_4mm_3D_gldm_LargeDependenceEmphasis   | Laplacian | GLDM             | GLDM      |
| log_sigma_4mm_3D_gldm_LargeDependenceHighGrayLevelEmphasis | Laplacian | GLDM             | GLDM      |
| log_sigma_4mm_3D_gldm_LargeDependenceLowGrayLevelEmphasis | Laplacian | GLDM             | GLDM      |
| Feature Name                                      | Method   | Feature Type     |
|-------------------------------------------------|----------|------------------|
| log_sigma_4mm_3D_gldm_LowGrayLevelEmphasis     | Laplacian| Texture          |
|                                                 |          | GLDM Features    |
| log_sigma_4mm_3D_gldm_SmallDependenceEmphasis   | Laplacian| Texture          |
|                                                 |          | GLDM Features    |
| log_sigma_4mm_3D_gldm_SmallDependenceHighGrayLevelEmphasis Laplacian | Laplacian| Texture          |
|                                                 |          | GLDM Features    |
| log_sigma_4mm_3D_gldm_SmallDependenceLowGrayLevelEmphasis Laplacian | Laplacian| Texture          |
|                                                 |          | GLDM Features    |
| log_sigma_4mm_3D_ngtdm_Busyness                 | Laplacian| Texture          |
|                                                 |          | NGTDM Features   |
| log_sigma_4mm_3D_ngtdm_Coarseness               | Laplacian| Texture          |
|                                                 |          | NGTDM Features   |
| log_sigma_4mm_3D_ngtdm_Complexity               | Laplacian| Texture          |
|                                                 |          | NGTDM Features   |
| log_sigma_4mm_3D_ngtdm_Contrast                 | Laplacian| Texture          |
|                                                 |          | NGTDM Features   |
| log_sigma_4mm_3D_ngtdm_Strength                 | Laplacian| Texture          |
|                                                 |          | NGTDM Features   |
| log_sigma_5mm_3D_firstorder_10Percentile        | Laplacian| First Order      |
|                                                 |          | Features         |
| log_sigma_5mm_3D_firstorder_90Percentile        | Laplacian| First Order      |
|                                                 |          | Features         |
| log_sigma_5mm_3D_firstorder_Energy               | Laplacian| First Order      |
|                                                 |          | Features         |
| Feature Name                                      | Type         | Order     |
|--------------------------------------------------|--------------|-----------|
| log_sigma_5mm_3D_firstorder_Entropy              | Laplacian    | First     |
| log_sigma_5mm_3D_firstorder_InterquartileRange   | Laplacian    | First     |
| log_sigma_5mm_3D_firstorder_Kurtosis             | Laplacian    | First     |
| log_sigma_5mm_3D_firstorder_Maximum              | Laplacian    | First     |
| log_sigma_5mm_3D_firstorder_MeanAbsoluteDeviation| Laplacian    | First     |
| log_sigma_5mm_3D_firstorder_Mean                 | Laplacian    | First     |
| log_sigma_5mm_3D_firstorder_Median               | Laplacian    | First     |
| log_sigma_5mm_3D_firstorder_Minimum              | Laplacian    | First     |
| log_sigma_5mm_3D_firstorder_Range                | Laplacian    | First     |
| log_sigma_5mm_3D_firstorder_RobustMeanAbsoluteDeviation | Laplacian | First     |
| log_sigma_5mm_3D_firstorder_RootMeanSquared      | Laplacian    | First     |
| log_sigma_5mm_3D_firstorder_Skewness             | Laplacian    | First     |
| log_sigma_5mm_3D_firstorder_TotalEnergy          | Laplacian    | First     |
| log_sigma_5mm_3D_firstorder_Uniformity           | Laplacian    | First     |
| log_sigma_5mm_3D_firstorder_Variance             | Laplacian    | First     |
| Feature Name                        | Type          | Description       |
|------------------------------------|---------------|-------------------|
| log_sigma_5mm_3D_glcm_Autocorrelation | Laplacian     | Texture Features--GLCM |
| log_sigma_5mm_3D_glcm_JointAverage  | Laplacian     | Texture Features--GLCM |
| log_sigma_5mm_3D_glcm_ClusterProminence | Laplacian     | Texture Features--GLCM |
| log_sigma_5mm_3D_glcm_ClusterShade  | Laplacian     | Texture Features--GLCM |
| log_sigma_5mm_3D_glcm_ClusterTendency | Laplacian     | Texture Features--GLCM |
| log_sigma_5mm_3D_glcm_Contrast      | Laplacian     | Texture Features--GLCM |
| log_sigma_5mm_3D_glcm_Correlation   | Laplacian     | Texture Features--GLCM |
| log_sigma_5mm_3D_glcm_DifferenceAverage | Laplacian     | Texture Features--GLCM |
| log_sigma_5mm_3D_glcm_DifferenceEntropy | Laplacian     | Texture Features--GLCM |
| log_sigma_5mm_3D_glcm_DifferenceVariance | Laplacian     | Texture Features--GLCM |
| log_sigma_5mm_3D_glcm_JointEnergy   | Laplacian     | Texture Features--GLCM |
| log_sigma_5mm_3D_glcm_JointEntropy  | Laplacian     | Texture Features--GLCM |
| log_sigma_5mm_3D_glcm_Imc1          | Laplacian     | Texture Features--GLCM |
| log_sigma_5mm_3D_glcm_Imc2          | Laplacian     | Texture Features--GLCM |
| log_sigma_5mm_3D_glcm_Idm           | Laplacian     | Texture Features--GLCM |
| Feature Name                                      | Edge Type | Feature Type          |
|--------------------------------------------------|-----------|-----------------------|
| log_sigma_5mm_3D_glcm_Idmn                       | Laplacian | Texture Features--GLCM|
| log_sigma_5mm_3D_glcm_Id                         | Laplacian | Texture Features--GLCM|
| log_sigma_5mm_3D_glcm_Idn                        | Laplacian | Texture Features--GLCM|
| log_sigma_5mm_3D_glcm_InverseVariance            | Laplacian | Texture Features--GLCM|
| log_sigma_5mm_3D_glcm_MaximumProbability         | Laplacian | Texture Features--GLCM|
| log_sigma_5mm_3D_glcm_SumEntropy                 | Laplacian | Texture Features--GLCM|
| log_sigma_5mm_3D_glcm_SumSquares                 | Laplacian | Texture Features--GLCM|
| log_sigma_5mm_3D_glrlm_GrayLevelNonUniformity    | Laplacian | Texture Features--GLRLM|
| log_sigma_5mm_3D_glrlm_GrayLevelNonUniformityNormalized | Laplacian | Texture Features--GLRLM|
| log_sigma_5mm_3D_glrlm_GrayLevelVariance         | Laplacian | Texture Features--GLRLM|
| log_sigma_5mm_3D_glrlm_HighGrayLevelRunEmphasis  | Laplacian | Texture Features--GLRLM|
| log_sigma_5mm_3D_glrlm_LongRunEmphasis           | Laplacian | Texture Features--GLRLM|
| log_sigma_5mm_3D_glrlm_LongRunHighGrayLevelEmphasis | Laplacian | Texture Features--GLRLM|
| log_sigma_5mm_3D_glrlm_LongRunLowGrayLevelEmphasis | Laplacian | Texture Features--GLRLM|
| Feature Name                                      | Method      | Texture Features          | GLRLM     |
|-------------------------------------------------|-------------|---------------------------|-----------|
| log_sigma_5mm_3D_gllrm_LowGrayLevelRunEmphasis  | Laplacian   |                           | GLRLM     |
| log_sigma_5mm_3D_gllrm_RunEntropy               | Laplacian   |                           | GLRLM     |
| log_sigma_5mm_3D_gllrm_RunLengthNonUniformity   | Laplacian   |                           | GLRLM     |
| log_sigma_5mm_3D_gllrm_RunLengthNonUniformityNormalized | Laplacian |                           | GLRLM     |
| log_sigma_5mm_3D_gllrm_RunPercentage            | Laplacian   |                           | GLRLM     |
| log_sigma_5mm_3D_gllrm_RunVariance              | Laplacian   |                           | GLRLM     |
| log_sigma_5mm_3D_gllrm_ShortRunEmphasis         | Laplacian   |                           | GLRLM     |
| log_sigma_5mm_3D_gllrm_ShortRunHighGrayLevelEmphasis | Laplacian |                           | GLRLM     |
| log_sigma_5mm_3D_gllrm_ShortRunLowGrayLevelEmphasis | Laplacian |                           | GLRLM     |
| log_sigma_5mm_3D_gllsm_GrayLevelNonUniformity   | Laplacian   |                           | GLRSZM    |
| log_sigma_5mm_3D_gllsm_GrayLevelNonUniformityNormalized | Laplacian |                           | GLRSZM    |
| Feature Name | Type   | Feature Group |
|--------------|--------|---------------|
| log_sigma_5mm_3D_glszm_GrayLevelVariance | Laplacian | Texture Features--GLSZM |
| log_sigma_5mm_3D_glszm_HighGrayLevelZoneEmphasis | Laplacian | Texture Features--GLSZM |
| log_sigma_5mm_3D_glszm_LargeAreaEmphasis | Laplacian | Texture Features--GLSZM |
| log_sigma_5mm_3D_glszm_LargeAreaHighGrayLevelEmphasis | Laplacian | Texture Features--GLSZM |
| log_sigma_5mm_3D_glszm_LargeAreaLowGrayLevelEmphasis | Laplacian | Texture Features--GLSZM |
| log_sigma_5mm_3D_glszm_LowGrayLevelZoneEmphasis | Laplacian | Texture Features--GLSZM |
| log_sigma_5mm_3D_glszm_SizeZoneNonUniformity | Laplacian | Texture Features--GLSZM |
| log_sigma_5mm_3D_glszm_SizeZoneNonUniformityNormalized | Laplacian | Texture Features--GLSZM |
| log_sigma_5mm_3D_glszm_SmallAreaEmphasis | Laplacian | Texture Features--GLSZM |
| log_sigma_5mm_3D_glszm_SmallAreaHighGrayLevelEmphasis | Laplacian | Texture Features--GLSZM |
| log_sigma_5mm_3D_glszm_SmallAreaLowGrayLevelEmphasis | Laplacian | Texture Features--GLSZM |
| log_sigma_5mm_3D_glszm_ZoneEntropy | Laplacian | Texture Features--GLSZM |
| Feature Name                        | Domain   | Texture Features   |
|------------------------------------|----------|-------------------|
| log_sigma_5mm_3D_glszm_ZonePercentage | Laplacian | GLSZM             |
| log_sigma_5mm_3D_glszm_ZoneVariance  | Laplacian | GLSZM             |
| log_sigma_5mm_3D_gldm_DependenceEntropy | Laplacian | GLDM              |
| log_sigma_5mm_3D_gldm_DependenceNonUniformity | Laplacian | GLDM              |
| log_sigma_5mm_3D_gldm_DependenceNonUniformityNormalized | Laplacian | GLDM              |
| log_sigma_5mm_3D_gldm_DependenceVariance | Laplacian | GLDM              |
| log_sigma_5mm_3D_gldm_GrayLevelNonUniformity | Laplacian | GLDM              |
| log_sigma_5mm_3D_gldm_GrayLevelVariance | Laplacian | GLDM              |
| log_sigma_5mm_3D_gldm_HighGrayLevelEmphasis | Laplacian | GLDM              |
| log_sigma_5mm_3D_gldm_LargeDependenceEmphasis | Laplacian | GLDM              |
| log_sigma_5mm_3D_gldm_LargeDependenceHighGrayLevelEmphasis | Laplacian | GLDM              |
| log_sigma_5mm_3D_gldm_LargeDependenceLowGrayLevelEmphasis | Laplacian | GLDM              |
| Feature Name                                      | Method          | Feature Type   |
|--------------------------------------------------|-----------------|----------------|
| log_sigma_5mm_3D_gldm_LowGrayLevelEmphasis      | Laplacian       | Texture        |
|                                                  | GLDM            | Features--     |
| log_sigma_5mm_3D_gldm_SmallDependenceEmphasis   | Laplacian       | Texture        |
|                                                  | GLDM            | Features--     |
| log_sigma_5mm_3D_gldm_SmallDependenceHighGrayLevelEmphasis | Laplacian     | Texture        |
|                                                  | GLDM            | Features--     |
| log_sigma_5mm_3D_gldm_SmallDependenceLowGrayLevelEmphasis | Laplacian   | Texture        |
|                                                  | GLDM            | Features--     |
| log_sigma_5mm_3D_ngtdm_Busyness                 | Laplacian       | Texture        |
|                                                  | NGTDM           | Features--     |
| log_sigma_5mm_3D_ngtdm_Coarseness               | Laplacian       | Texture        |
|                                                  | NGTDM           | Features--     |
| log_sigma_5mm_3D_ngtdm_Complexity               | Laplacian       | Texture        |
|                                                  | NGTDM           | Features--     |
| log_sigma_5mm_3D_ngtdm_Contrast                 | Laplacian       | Texture        |
|                                                  | NGTDM           | Features--     |
| log_sigma_5mm_3D_ngtdm_Strength                 | Laplacian       | Texture        |
|                                                  | NGTDM           | Features--     |
| wavelet_LLH_firstorder_10Percentile             | wavelet         | First          |
|                                                  | Order           | Features       |
| wavelet_LLH_firstorder_90Percentile             | wavelet         | First          |
|                                                  | Order           | Features       |
| wavelet_LLH_firstorder_Energy                    | wavelet         | First          |
|                                                  | Order           | Features       |
| Feature Name                                      | Type     | 1st Order Features |
|--------------------------------------------------|----------|---------------------|
| wavelet_LLH_firstorder_Entropy                   | wavelet  |                     |
| wavelet_LLH_firstorder_InterquartileRange        | wavelet  |                     |
| wavelet_LLH_firstorder_Kurtosis                  | wavelet  |                     |
| wavelet_LLH_firstorder_Maximum                   | wavelet  |                     |
| wavelet_LLH_firstorder_MeanAbsoluteDeviation     | wavelet  |                     |
| wavelet_LLH_firstorder_Mean                      | wavelet  |                     |
| wavelet_LLH_firstorder_Median                    | wavelet  |                     |
| wavelet_LLH_firstorder_Minimum                   | wavelet  |                     |
| wavelet_LLH_firstorder_Range                     | wavelet  |                     |
| wavelet_LLH_firstorder_RobustMeanAbsoluteDeviation | wavelet |                     |
| wavelet_LLH_firstorder_RootMeanSquared           | wavelet  |                     |
| wavelet_LLH_firstorder_Skewness                  | wavelet  |                     |
| wavelet_LLH_firstorder_TotalEnergy               | wavelet  |                     |
| wavelet_LLH_firstorder_Uniformity                | wavelet  |                     |
| wavelet_LLH_firstorder_Variance                  | wavelet  |                     |
| Feature Name                          | Method | Feature Type              |
|--------------------------------------|--------|---------------------------|
| wavelet_LLH_glem_Autocorrelation     | wavelet| Texture Features--GLCM    |
| wavelet_LLH_glem_JointAverage        | wavelet| Texture Features--GLCM    |
| wavelet_LLH_glem_ClusterProminence   | wavelet| Texture Features--GLCM    |
| wavelet_LLH_glem_ClusterShade        | wavelet| Texture Features--GLCM    |
| wavelet_LLH_glem_ClusterTendency     | wavelet| Texture Features--GLCM    |
| wavelet_LLH_glem_Contrast            | wavelet| Texture Features--GLCM    |
| wavelet_LLH_glem_Correlation         | wavelet| Texture Features--GLCM    |
| wavelet_LLH_glem_DifferenceAverage   | wavelet| Texture Features--GLCM    |
| wavelet_LLH_glem_DifferenceEntropy   | wavelet| Texture Features--GLCM    |
| wavelet_LLH_glem_DifferenceVariance  | wavelet| Texture Features--GLCM    |
| wavelet_LLH_glem_JointEnergy         | wavelet| Texture Features--GLCM    |
| wavelet_LLH_glem_JointEntropy        | wavelet| Texture Features--GLCM    |
| wavelet_LLH_glem_Imc1                | wavelet| Texture Features--GLCM    |
| wavelet_LLH_glem_Imc2                | wavelet| Texture Features--GLCM    |
| wavelet_LLH_glem_Idm                 | wavelet| Texture Features--GLCM    |
| Feature Name                                      | Type       | Description          |
|--------------------------------------------------|------------|----------------------|
| wavelet_LLH_glem_Idmn                            | wavelet    | Texture Features--GLCM |
| wavelet_LLH_glem_Id                              | wavelet    | Texture Features--GLCM |
| wavelet_LLH_glem_Idn                             | wavelet    | Texture Features--GLCM |
| wavelet_LLH_glem_InverseVariance                 | wavelet    | Texture Features--GLCM |
| wavelet_LLH_glem_MaximumProbability              | wavelet    | Texture Features--GLCM |
| wavelet_LLH_glem_SumEntropy                      | wavelet    | Texture Features--GLCM |
| wavelet_LLH_glem_SumSquares                      | wavelet    | Texture Features--GLCM |
| wavelet_LLH_grlm_GrayLevelNonUniformity          | wavelet    | Texture Features--GLRLM |
| wavelet_LLH_grlm_GrayLevelNonUniformityNormalized| wavelet    | Texture Features--GLRLM |
| wavelet_LLH_grlm_GrayLevelVariance               | wavelet    | Texture Features--GLRLM |
| wavelet_LLH_grlm_HighGrayLevelRunEmphasis        | wavelet    | Texture Features--GLRLM |
| wavelet_LLH_grlm_LongRunEmphasis                 | wavelet    | Texture Features--GLRLM |
| wavelet_LLH_grlm_LongRunHighGrayLevelEmphasis    | wavelet    | Texture Features--GLRLM |
| Feature Name | Type      | Description                      |
|-------------|-----------|----------------------------------|
| wavelet_LLH_glrlm_LongRunLowGrayLevelEmphasis | wavelet | Texture Features--GLRLM          |
| wavelet_LLH_glrlm_LowGrayLevelRunEmphasis   | wavelet | Texture Features--GLRLM          |
| wavelet_LLH_glrlm_RunEntropy                 | wavelet | Texture Features--GLRLM          |
| wavelet_LLH_glrlm_RunLengthNonUniformity     | wavelet | Texture Features--GLRLM          |
| wavelet_LLH_glrlm_RunLengthNonUniformityNormalized | wavelet | Texture Features--GLRLM          |
| wavelet_LLH_glrlm_RunPercentage              | wavelet | Texture Features--GLRLM          |
| wavelet_LLH_glrlm_RunVariance                | wavelet | Texture Features--GLRLM          |
| wavelet_LLH_glrlm_ShortRunEmphasis           | wavelet | Texture Features--GLRLM          |
| wavelet_LLH_glrlm_ShortRunHighGrayLevelEmphasis | wavelet | Texture Features--GLRLM          |
| wavelet_LLH_glrlm_ShortRunLowGrayLevelEmphasis | wavelet | Texture Features--GLRLM          |
| wavelet_LLH_glszm_GrayLevelNonUniformity     | wavelet | Texture Features--GLSZM          |
| wavelet_LLH_glszm_GrayLevelNonUniformityNormalized | wavelet | Texture Features--GLSZM          |
| Feature Name                                      | Type   | Texture Features--GLSZM |
|--------------------------------------------------|--------|-------------------------|
| wavelet_LLH_glszm_GrayLevelVariance              | wavelet|                         |
| wavelet_LLH_glszm_HighGrayLevelZoneEmphasis     | wavelet|                         |
| wavelet_LLH_glszm_LargeAreaEmphasis              | wavelet|                         |
| wavelet_LLH_glszm_LargeAreaHighGrayLevelEmphasis| wavelet|                         |
| wavelet_LLH_glszm_LargeAreaLowGrayLevelEmphasis  | wavelet|                         |
| wavelet_LLH_glszm_LowGrayLevelZoneEmphasis       | wavelet|                         |
| wavelet_LLH_glszm_SizeZoneNonUniformity          | wavelet|                         |
| wavelet_LLH_glszm_SizeZoneNonUniformityNormalized| wavelet|                         |
| wavelet_LLH_glszm_SmallAreaEmphasis              | wavelet|                         |
| wavelet_LLH_glszm_SmallAreaHighGrayLevelEmphasis | wavelet|                         |
| wavelet_LLH_glszm_SmallAreaLowGrayLevelEmphasis  | wavelet|                         |
| wavelet_LLH_glszm_ZoneEntropy                    | wavelet|                         |
| Feature Name                                      | Method | Texture Features | Algorithm  |
|--------------------------------------------------|--------|------------------|------------|
| wavelet_LLH_glszm_ZonePercentage                | wavelet | GLSZM            |            |
| wavelet_LLH_glszm_ZoneVariance                  | wavelet | GLSZM            |            |
| wavelet_LLH_gldm_DependenceEntropy              | wavelet | GLDM             |            |
| wavelet_LLH_gldm_DependenceNonUniformity        | wavelet | GLDM             |            |
| wavelet_LLH_gldm_DependenceNonUniformityNormalized | wavelet | GLDM             |            |
| wavelet_LLH_gldm_DependenceVariance             | wavelet | GLDM             |            |
| wavelet_LLH_gldm_GrayLevelNonUniformity         | wavelet | GLDM             |            |
| wavelet_LLH_gldm_GrayLevelVariance              | wavelet | GLDM             |            |
| wavelet_LLH_gldm_HighGrayLevelEmphasis          | wavelet | GLDM             |            |
| wavelet_LLH_gldm_LargeDependenceEmphasis        | wavelet | GLDM             |            |
| wavelet_LLH_gldm_LargeDependenceHighGrayLevelEmphasis | wavelet | GLDM             |            |
| wavelet_LLH_gldm_LargeDependenceLowGrayLevelEmphasis | wavelet | GLDM             |            |
| Feature Name                                      | Method | Type       | Emphasis                  |
|--------------------------------------------------|--------|------------|---------------------------|
| wavelet_LLH_gldm_LowGrayLevelEmphasis            | wavelet| Texture    | GLDM                      |
| wavelet_LLH_gldm_SmallDependenceEmphasis         | wavelet| Texture    | GLDM                      |
| wavelet_LLH_gldm_SmallDependenceHighGrayLevelEmphasis | wavelet| Texture    | GLDM                      |
| wavelet_LLH_gldm_SmallDependenceLowGrayLevelEmphasis | wavelet| Texture    | GLDM                      |
| wavelet_LLH_ngtdm_Busyness                       | wavelet| Texture    | NGTDM                     |
| wavelet_LLH_ngtdm_Coarseness                    | wavelet| Texture    | NGTDM                     |
| wavelet_LLH_ngtdm_Complexity                    | wavelet| Texture    | NGTDM                     |
| wavelet_LLH_ngtdm_Contrast                      | wavelet| Texture    | NGTDM                     |
| wavelet_LLH_ngtdm_Strength                      | wavelet| Texture    | NGTDM                     |
| wavelet_LHL_firstorder_10Percentile              | wavelet| First      | Order                     |
| wavelet_LHL_firstorder_90Percentile              | wavelet| First      | Order                     |
| wavelet_LHL_firstorder_Energy                    | wavelet| First      | Order                     |
| Feature                                           | Type          | Order Features |
|---------------------------------------------------|---------------|----------------|
| wavelet_LHL_firstorder_Entropy                    | wavelet       | First          |
| wavelet_LHL_firstorderInteropartileRange           | wavelet       | First          |
| wavelet_LHL_firstorder_Kurtosis                   | wavelet       | First          |
| wavelet_LHL_firstorder_Maximum                    | wavelet       | First          |
| wavelet_LHL_firstorder_MeanAbsoluteDeviation      | wavelet       | First          |
| wavelet_LHL_firstorder_Mean                        | wavelet       | First          |
| wavelet_LHL_firstorder_Median                     | wavelet       | First          |
| wavelet_LHL_firstorder_Minimum                    | wavelet       | First          |
| wavelet_LHL_firstorder_Range                      | wavelet       | First          |
| wavelet_LHL_firstorder_RobustMeanAbsoluteDeviation| wavelet       | First          |
| wavelet_LHL_firstorder_RootMeanSquared            | wavelet       | First          |
| wavelet_LHL_firstorder_Skewness                   | wavelet       | First          |
| wavelet_LHL_firstorder_TotalEnergy                | wavelet       | First          |
| wavelet_LHL_firstorder_Uniformity                 | wavelet       | First          |
| wavelet_LHL_firstorder_Variance                   | wavelet       | First          |
| Wavelet Texture Features--GLCM |
|--------------------------------|
| wavelet_LHL_glem_Autocorrelation | wavelet | Texture Features--GLCM |
| wavelet_LHL_glem_JointAverage | wavelet | Texture Features--GLCM |
| wavelet_LHL_glem_ClusterProminence | wavelet | Texture Features--GLCM |
| wavelet_LHL_glem_ClusterShade | wavelet | Texture Features--GLCM |
| wavelet_LHL_glem_ClusterTendency | wavelet | Texture Features--GLCM |
| wavelet_LHL_glem_Contrast | wavelet | Texture Features--GLCM |
| wavelet_LHL_glem_Correlation | wavelet | Texture Features--GLCM |
| wavelet_LHL_glem_DifferenceAverage | wavelet | Texture Features--GLCM |
| wavelet_LHL_glem_DifferenceEntropy | wavelet | Texture Features--GLCM |
| wavelet_LHL_glem_DifferenceVariance | wavelet | Texture Features--GLCM |
| wavelet_LHL_glem_JointEnergy | wavelet | Texture Features--GLCM |
| wavelet_LHL_glem_JointEntropy | wavelet | Texture Features--GLCM |
| wavelet_LHL_glem_Imc1 | wavelet | Texture Features--GLCM |
| wavelet_LHL_glem_Imc2 | wavelet | Texture Features--GLCM |
| wavelet_LHL_glem_Idm | wavelet | Texture Features--GLCM |
| Feature Name                                    | Type    | Description       |
|------------------------------------------------|---------|-------------------|
| wavelet_LHL_glem_Idmn                           | wavelet | Texture GLCM      |
| wavelet_LHL_glem_Id                             | wavelet | Texture GLCM      |
| wavelet_LHL_glem_Idn                            | wavelet | Texture GLCM      |
| wavelet_LHL_glem_InverseVariance                | wavelet | Texture GLCM      |
| wavelet_LHL_glem_MaximumProbability             | wavelet | Texture GLCM      |
| wavelet_LHL_glem_SumEntropy                     | wavelet | Texture GLCM      |
| wavelet_LHL_glem_SumSquares                     | wavelet | Texture GLCM      |
| wavelet_LHL_grlm_GrayLevelNonUniformity         | wavelet | Texture GLRLM     |
| wavelet_LHL_grlm_GrayLevelNonUniformityNormalized | wavelet | Texture GLRLM     |
| wavelet_LHL_grlm_GrayLevelVariance              | wavelet | Texture GLRLM     |
| wavelet_LHL_grlm_HighGrayLevelRunEmphasis       | wavelet | Texture GLRLM     |
| wavelet_LHL_grlm_LongRunEmphasis                | wavelet | Texture GLRLM     |
| wavelet_LHL_grlm_LongRunHighGrayLevelEmphasis   | wavelet | Texture GLRLM     |
| wavelet_LHL_grlm_LongRunLowGrayLevelEmphasis    | wavelet | Texture GLRLM     |
| Feature Name                                      | Wavelet | Module   |
|--------------------------------------------------|---------|----------|
| wavelet_LHL_gllrm_LowGrayLevelRunEmphasis       | wavelet | GLRLM    |
| wavelet_LHL_gllrm_RunEntropy                    | wavelet | Texture  |
|                                                   |         | GLRLM    |
| wavelet_LHL_gllrm_RunLengthNonUniformity        | wavelet | Texture  |
|                                                   |         | GLRLM    |
| wavelet_LHL_gllrm_RunLengthNonUniformityNormalized | wavelet | Texture  |
|                                                   |         | GLRLM    |
| wavelet_LHL_gllrm_RunPercentage                 | wavelet | Texture  |
|                                                   |         | GLRLM    |
| wavelet_LHL_gllrm_RunVariance                   | wavelet | Texture  |
|                                                   |         | GLRLM    |
| wavelet_LHL_gllrm_ShortRunEmphasis              | wavelet | Texture  |
|                                                   |         | GLRLM    |
| wavelet_LHL_gllrm_ShortRunHighGrayLevelEmphasis | wavelet | Texture  |
|                                                   |         | GLRLM    |
| wavelet_LHL_gllrm_ShortRunLowGrayLevelEmphasis  | wavelet | Texture  |
|                                                   |         | GLRLM    |
| wavelet_LHL_glszm_GrayLevelNonUniformity        | wavelet | Texture  |
|                                                   |         | GLSIZM   |
| wavelet_LHL_glszm_GrayLevelNonUniformityNormalized | wavelet | Texture  |
|                                                   |         | GLSIZM   |
| Feature                                           | Method  | Texture Features |
|---------------------------------------------------|---------|------------------|
| wavelet_LHL_glszm_GrayLevelVariance               | wavelet | GLSZM            |
| wavelet_LHL_glszm_HighGrayLevelZoneEmphasis      | wavelet | GLSZM            |
| wavelet_LHL_glszm_LargeAreaEmphasis              | wavelet | GLSZM            |
| wavelet_LHL_glszm_LargeAreaHighGrayLevelEmphasis | wavelet | GLSZM            |
| wavelet_LHL_glszm_LargeAreaLowGrayLevelEmphasis  | wavelet | GLSZM            |
| wavelet_LHL_glszm_LowGrayLevelZoneEmphasis       | wavelet | GLSZM            |
| wavelet_LHL_glszm_SizeZoneNonUniformity          | wavelet | GLSZM            |
| wavelet_LHL_glszm_SizeZoneNonUniformityNormalized| wavelet | GLSZM            |
| wavelet_LHL_glszm_SmallAreaEmphasis              | wavelet | GLSZM            |
| wavelet_LHL_glszm_SmallAreaHighGrayLevelEmphasis | wavelet | GLSZM            |
| wavelet_LHL_glszm_SmallAreaLowGrayLevelEmphasis  | wavelet | GLSZM            |
| wavelet_LHL_glszm_ZoneEntropy                     | wavelet | GLSZM            |
| Feature Name                                      | Wavelet Texture Features | GLSZM | GLDM |
|--------------------------------------------------|--------------------------|-------|------|
| wavelet_LHL_glszm_ZonePercentage                 | wavelet                  |       |      |
| wavelet_LHL_glszm_ZoneVariance                   | wavelet                  |       |      |
| wavelet_LHL_gldm_DependenceEntropy               | wavelet                  |       |      |
| wavelet_LHL_gldm_DependenceNonUniformity         | wavelet                  |       |      |
| wavelet_LHL_gldm_DependenceNonUniformityNormalized | wavelet                  |       |      |
| wavelet_LHL_gldm_DependenceVariance              | wavelet                  |       |      |
| wavelet_LHL_gldm_GrayLevelNonUniformity          | wavelet                  |       |      |
| wavelet_LHL_gldm_GrayLevelVariance               | wavelet                  |       |      |
| wavelet_LHL_gldm_HighGrayLevelEmphasis           | wavelet                  |       |      |
| wavelet_LHL_gldm_LargeDependenceEmphasis         | wavelet                  |       |      |
| wavelet_LHL_gldm_LargeDependenceHighGrayLevelEmphasis | wavelet                  |       |      |
| wavelet_LHL_gldm_LargeDependenceLowGrayLevelEmphasis | wavelet                  |       |      |
| Feature Name                                                      | Method | Description |
|-----------------------------------------------------------------|--------|-------------|
| wavelet_LHL_gldm_LowGrayLevelEmphasis                           | wavelet| Texture Features--GLDM |
| wavelet_LHL_gldm_SmallDependenceEmphasis                        | wavelet| Texture Features--GLDM |
| wavelet_LHL_gldm_SmallDependenceHighGrayLevelEmphasis          | wavelet| Texture Features--GLDM |
| wavelet_LHL_gldm_SmallDependenceLowGrayLevelEmphasis           | wavelet| Texture Features--GLDM |
| wavelet_LHL_ngtdm_Busyness                                      | wavelet| Texture Features--NGTDM |
| wavelet_LHL_ngtdm_Coarseness                                    | wavelet| Texture Features--NGTDM |
| wavelet_LHL_ngtdm_Complexity                                    | wavelet| Texture Features--NGTDM |
| wavelet_LHL_ngtdm_Contrast                                      | wavelet| Texture Features--NGTDM |
| wavelet_LHL_ngtdm_Strength                                      | wavelet| Texture Features--NGTDM |
| wavelet_LHH_firstorder_10Percentile                             | wavelet| First Order Features |
| wavelet_LHH_firstorder_90Percentile                             | wavelet| First Order Features |
| wavelet_LHH_firstorder_Energy                                   | wavelet| First Order Features |
| Feature Name                                      | Type   | First Order Features |
|--------------------------------------------------|--------|----------------------|
| wavelet_LHH_firstorder_Entropy                   | wavelet|                      |
| wavelet_LHH_firstorder_InterquartileRange        | wavelet|                      |
| wavelet_LHH_firstorder_Kurtosis                  | wavelet|                      |
| wavelet_LHH_firstorder_Maximum                   | wavelet|                      |
| wavelet_LHH_firstorder_MeanAbsoluteDeviation     | wavelet|                      |
| wavelet_LHH_firstorder_Mean                      | wavelet|                      |
| wavelet_LHH_firstorder_Median                    | wavelet|                      |
| wavelet_LHH_firstorder_Minimum                   | wavelet|                      |
| wavelet_LHH_firstorder_Range                     | wavelet|                      |
| wavelet_LHH_firstorder_RobustMeanAbsoluteDeviation | wavelet|                      |
| wavelet_LHH_firstorder_RootMeanSquared           | wavelet|                      |
| wavelet_LHH_firstorder_Skewness                  | wavelet|                      |
| wavelet_LHH_firstorder_TotalEnergy               | wavelet|                      |
| wavelet_LHH_firstorder_Uniformity                | wavelet|                      |
| wavelet_LHH_firstorder_Variance                  | wavelet|                      |
| wavelet_LHH Glcm Autocorrelation | wavelet | Texture Features--GLCM |
| wavelet_LHH Glcm JointAverage | wavelet | Texture Features--GLCM |
| wavelet_LHH Glcm ClusterProminence | wavelet | Texture Features--GLCM |
| wavelet_LHH Glcm ClusterShade | wavelet | Texture Features--GLCM |
| wavelet_LHH Glcm ClusterTendency | wavelet | Texture Features--GLCM |
| wavelet_LHH Glcm Contrast | wavelet | Texture Features--GLCM |
| wavelet_LHH Glcm Correlation | wavelet | Texture Features--GLCM |
| wavelet_LHH Glcm DifferenceAverage | wavelet | Texture Features--GLCM |
| wavelet_LHH Glcm DifferenceEntropy | wavelet | Texture Features--GLCM |
| wavelet_LHH Glcm DifferenceVariance | wavelet | Texture Features--GLCM |
| wavelet_LHH Glcm JointEnergy | wavelet | Texture Features--GLCM |
| wavelet_LHH Glcm JointEntropy | wavelet | Texture Features--GLCM |
| wavelet_LHH Glcm Imc1 | wavelet | Texture Features--GLCM |
| wavelet_LHH Glcm Imc2 | wavelet | Texture Features--GLCM |
| wavelet_LHH Glcm Idm | wavelet | Texture Features--GLCM |
| Feature Name                                      | Method  | Texture Features--GLCM |
|--------------------------------------------------|---------|------------------------|
| wavelet_LHH_glcm_Idmn                             | wavelet | Texture Features--GLCM |
| wavelet_LHH_glcm_Id                               | wavelet | Texture Features--GLCM |
| wavelet_LHH_glcm_Idn                              | wavelet | Texture Features--GLCM |
| wavelet_LHH_glcm_InverseVariance                  | wavelet | Texture Features--GLCM |
| wavelet_LHH_glcm_MaximumProbability               | wavelet | Texture Features--GLCM |
| wavelet_LHH_glcm_SumEntropy                       | wavelet | Texture Features--GLCM |
| wavelet_LHH_glcm_SumSquares                       | wavelet | Texture Features--GLCM |
| wavelet_LHH_glrlm_GrayLevelNonUniformity          | wavelet | Texture Features--GLRLM|
| wavelet_LHH_glrlm_GrayLevelNonUniformityNormalized | wavelet | Texture Features--GLRLM|
| wavelet_LHH_glrlm_GrayLevelVariance               | wavelet | Texture Features--GLRLM|
| wavelet_LHH_glrlm_HighGrayLevelRunEmphasis       | wavelet | Texture Features--GLRLM|
| wavelet_LHH_glrlm_LongRunEmphasis                 | wavelet | Texture Features--GLRLM|
| wavelet_LHH_glrlm_LongRunHighGrayLevelEmphasis   | wavelet | Texture Features--GLRLM|
| Feature Name                                                 | Wavelet Feature | Texture Feature |
|--------------------------------------------------------------|-----------------|-----------------|
| wavelet_LHH_gllrm_LongRunLowGrayLevelEmphasis               | wavelet         | Texture         |
|                                                               |                 | Features--GLRLM|
| wavelet_LHH_gllrm_LowGrayLevelRunEmphasis                   | wavelet         | Texture         |
|                                                               |                 | Features--GLRLM|
| wavelet_LHH_gllrm_RunEntropy                                | wavelet         | Texture         |
|                                                               |                 | Features--GLRLM|
| wavelet_LHH_gllrm_RunLengthNonUniformity                    | wavelet         | Texture         |
|                                                               |                 | Features--GLRLM|
| wavelet_LHH_gllrm_RunLengthNonUniformityNormalized          | wavelet         | Texture         |
|                                                               |                 | Features--GLRLM|
| wavelet_LHH_gllrm_RunPercentage                             | wavelet         | Texture         |
|                                                               |                 | Features--GLRLM|
| wavelet_LHH_gllrm_RunVariance                               | wavelet         | Texture         |
|                                                               |                 | Features--GLRLM|
| wavelet_LHH_gllrm_ShortRunEmphasis                          | wavelet         | Texture         |
|                                                               |                 | Features--GLRLM|
| wavelet_LHH_gllrm_ShortRunHighGrayLevelEmphasis             | wavelet         | Texture         |
|                                                               |                 | Features--GLRLM|
| wavelet_LHH_gllrm_ShortRunLowGrayLevelEmphasis              | wavelet         | Texture         |
|                                                               |                 | Features--GLRLM|
| wavelet_LHH_gllrm_GrayLevelNonUniformity                    | wavelet         | Texture         |
|                                                               |                 | Features--GLSZM|
| wavelet_LHH_gllrm_GrayLevelNonUniformityNormalized          | wavelet         | Texture         |
|                                                               |                 | Features--GLSZM|
| Feature Name                          | Type     | Description                               |
|--------------------------------------|----------|-------------------------------------------|
| wavelet_LHH_glszm_GrayLevelVariance  | wavelet  | Texture Features--GLSZM                   |
| wavelet_LHH_glszm_HighGrayLevelZoneEmphasis | wavelet  | Texture Features--GLSZM                   |
| wavelet_LHH_glszm_LargeAreaEmphasis  | wavelet  | Texture Features--GLSZM                   |
| wavelet_LHH_glszm_LargeAreaHighGrayLevelEmphasis | wavelet  | Texture Features--GLSZM                   |
| wavelet_LHH_glszm_LargeAreaLowGrayLevelEmphasis | wavelet  | Texture Features--GLSZM                   |
| wavelet_LHH_glszm_LowGrayLevelZoneEmphasis | wavelet  | Texture Features--GLSZM                   |
| wavelet_LHH_glszm_SizeZoneNonUniformity | wavelet  | Texture Features--GLSZM                   |
| wavelet_LHH_glszm_SizeZoneNonUniformityNormalized | wavelet  | Texture Features--GLSZM                   |
| wavelet_LHH_glszm_SmallAreaEmphasis  | wavelet  | Texture Features--GLSZM                   |
| wavelet_LHH_glszm_SmallAreaHighGrayLevelEmphasis | wavelet  | Texture Features--GLSZM                   |
| wavelet_LHH_glszm_SmallAreaLowGrayLevelEmphasis | wavelet  | Texture Features--GLSZM                   |
| wavelet_LHH_glszm_ZoneEntropy        | wavelet  | Texture Features--                      |
| Feature Name                                      | Method        | Texture Features | Image Analysis Technique |
|--------------------------------------------------|---------------|------------------|--------------------------|
| wavelet_LHH_glszm_ZonePercentage                 | wavelet       | GLSZM            |                          |
| wavelet_LHH_glszm_ZoneVariance                   | wavelet       | GLSZM            |                          |
| wavelet_LHH_gldm_DependenceEntropy               | wavelet       | GLDM             |                          |
| wavelet_LHH_gldm_DependenceNonUniformity         | wavelet       | GLDM             |                          |
| wavelet_LHH_gldm_DependenceNonUniformityNormalized | wavelet       | GLDM             |                          |
| wavelet_LHH_gldm_DependenceVariance              | wavelet       | GLDM             |                          |
| wavelet_LHH_gldm_GrayLevelNonUniformity          | wavelet       | GLDM             |                          |
| wavelet_LHH_gldm_GrayLevelVariance               | wavelet       | GLDM             |                          |
| wavelet_LHH_gldm_HighGrayLevelEmphasis           | wavelet       | GLDM             |                          |
| wavelet_LHH_gldm_LargeDependenceEmphasis         | wavelet       | GLDM             |                          |
| wavelet_LHH_gldm_LargeDependenceHighGrayLevelEmphasis | wavelet       | GLDM             |                          |
| wavelet_LHH_gldm_LargeDependenceLowGrayLevelEmphasis | wavelet       | GLDM             |                          |
| Feature Name                                      | Method      | Category         |
|--------------------------------------------------|-------------|------------------|
| wavelet_LHH_gldm_LowGrayLevelEmphasis           | wavelet     | Texture Features--GLDM |
| wavelet_LHH_gldm_SmallDependenceEmphasis        | wavelet     | Texture Features--GLDM |
| wavelet_LHH_gldm_SmallDependenceHighGrayLevelEmphasis | wavelet     | Texture Features--GLDM |
| wavelet_LHH_gldm_SmallDependenceLowGrayLevelEmphasis | wavelet     | Texture Features--GLDM |
| wavelet_LHH_ngtdm_Busyness                       | wavelet     | Texture Features--NGTDM |
| wavelet_LHH_ngtdm_Coarseness                     | wavelet     | Texture Features--NGTDM |
| wavelet_LHH_ngtdm_Complexity                     | wavelet     | Texture Features--NGTDM |
| wavelet_LHH_ngtdm_Contrast                       | wavelet     | Texture Features--NGTDM |
| wavelet_LHH_ngtdm_Strength                       | wavelet     | Texture Features--NGTDM |
| wavelet_HLL_firstorder_10Percentile             | wavelet     | First Order Features |
| wavelet_HLL_firstorder_90Percentile             | wavelet     | First Order Features |
| wavelet_HLL_firstorder_Energy                   | wavelet     | First Order Features |
| Feature Name                                      | Method | Order | Feature Type |
|--------------------------------------------------|--------|-------|--------------|
| wavelet_HLL_firstorder_Entropy                   | wavelet| First | Order Features |
| wavelet_HLL_firstorder_InterquartileRange        | wavelet| First | Order Features |
| wavelet_HLL_firstorder_Kurtosis                  | wavelet| First | Order Features |
| wavelet_HLL_firstorder_Maximum                   | wavelet| First | Order Features |
| wavelet_HLL_firstorder_MeanAbsoluteDeviation     | wavelet| First | Order Features |
| wavelet_HLL_firstorder_Mean                       | wavelet| First | Order Features |
| wavelet_HLL_firstorder_Median                    | wavelet| First | Order Features |
| wavelet_HLL_firstorder_Minimum                   | wavelet| First | Order Features |
| wavelet_HLL_firstorder_Range                     | wavelet| First | Order Features |
| wavelet_HLL_firstorder_RobustMeanAbsoluteDeviation| wavelet| First | Order Features |
| wavelet_HLL_firstorder_RootMeanSquared           | wavelet| First | Order Features |
| wavelet_HLL_firstorder_Skewness                  | wavelet| First | Order Features |
| wavelet_HLL_firstorder_TotalEnergy               | wavelet| First | Order Features |
| wavelet_HLL_firstorder_Uniformity                | wavelet| First | Order Features |
| wavelet_HLL_firstorder_Variance                  | wavelet| First | Order Features |
| Feature Name                          | Type     | Description          |
|--------------------------------------|----------|----------------------|
| wavelet_HLL_glem_Autocorrelation     | wavelet  | Texture Features--GLCM |
| wavelet_HLL_glem_JointAverage        | wavelet  | Texture Features--GLCM |
| wavelet_HLL_glem_ClusterProminence   | wavelet  | Texture Features--GLCM |
| wavelet_HLL_glem_ClusterShade        | wavelet  | Texture Features--GLCM |
| wavelet_HLL_glem_ClusterTendency     | wavelet  | Texture Features--GLCM |
| wavelet_HLL_glem_Contrast            | wavelet  | Texture Features--GLCM |
| wavelet_HLL_glem_Correlation         | wavelet  | Texture Features--GLCM |
| wavelet_HLL_glem_DifferenceAverage   | wavelet  | Texture Features--GLCM |
| wavelet_HLL_glem_DifferenceEntropy   | wavelet  | Texture Features--GLCM |
| wavelet_HLL_glem_DifferenceVariance  | wavelet  | Texture Features--GLCM |
| wavelet_HLL_glem_JointEnergy         | wavelet  | Texture Features--GLCM |
| wavelet_HLL_glem_JointEntropy        | wavelet  | Texture Features--GLCM |
| wavelet_HLL_glem_Idm                 | wavelet  | Texture Features--GLCM |
| Feature Name                                      | Type   | Description               |
|--------------------------------------------------|--------|---------------------------|
| wavelet_HLL_glem_Idmn                            | wavelet| Texture Features--GLCM    |
| wavelet_HLL_glem_Id                              | wavelet| Texture Features--GLCM    |
| wavelet_HLL_glem_Idn                             | wavelet| Texture Features--GLCM    |
| wavelet_HLL_glem_InverseVariance                 | wavelet| Texture Features--GLCM    |
| wavelet_HLL_glem_MaximumProbability              | wavelet| Texture Features--GLCM    |
| wavelet_HLL_glem_SumEntropy                      | wavelet| Texture Features--GLCM    |
| wavelet_HLL_glem_SumSquares                      | wavelet| Texture Features--GLCM    |
| wavelet_HLL_grlm_GrayLevelNonUniformity          | wavelet| Texture Features--GLRLM   |
| wavelet_HLL_grlm_GrayLevelNonUniformityNormalized| wavelet| Texture Features--GLRLM   |
| wavelet_HLL_grlm_GrayLevelVariance               | wavelet| Texture Features--GLRLM   |
| wavelet_HLL_grlm_HighGrayLevelRunEmphasis        | wavelet| Texture Features--GLRLM   |
| wavelet_HLL_grlm_LongRunEmphasis                 | wavelet| Texture Features--GLRLM   |
| wavelet_HLL_grlm_LongRunHighGrayLevelEmphasis    | wavelet| Texture Features--GLRLM   |
| wavelet_HLL_grlm_LongRunLowGrayLevelEmphasis     | wavelet| Texture Features--GLRLM   |
| Feature Name                                                      | Wavelet | Texture Features |
|-----------------------------------------------------------------|---------|------------------|
| wavelet_HLL_glrIm_LowGrayLevelRunEmphasis                       | wavelet | GLRLM            |
| wavelet_HLL_glrIm_RunEntropy                                    | wavelet | GLRLM            |
| wavelet_HLL_glrIm_RunLengthNonUniformity                        | wavelet | GLRLM            |
| wavelet_HLL_glrIm_RunLengthNonUniformityNormalized              | wavelet | GLRLM            |
| wavelet_HLL_glrIm_RunPercentage                                 | wavelet | GLRLM            |
| wavelet_HLL_glrIm_RunVariance                                   | wavelet | GLRLM            |
| wavelet_HLL_glrIm_ShortRunEmphasis                              | wavelet | GLRLM            |
| wavelet_HLL_glrIm_ShortRunHighGrayLevelEmphasis                 | wavelet | GLRLM            |
| wavelet_HLL_glrIm_ShortRunLowGrayLevelEmphasis                  | wavelet | GLRLM            |
| wavelet_HLL_glszm_GrayLevelNonUniformity                        | wavelet | GLSZM            |
| wavelet_HLL_glszm_GrayLevelNonUniformityNormalized              | wavelet | GLSZM            |
| Feature Name                                      | Method  | Texture      |
|--------------------------------------------------|---------|--------------|
| wavelet_HLL_glszm_GrayLevelVariance              | wavelet | GLSZM        |
| wavelet_HLL_glszm_HighGrayLevelZoneEmphasis     | wavelet | GLSZM        |
| wavelet_HLL_glszm_LargeAreaEmphasis              | wavelet | GLSZM        |
| wavelet_HLL_glszm_LargeAreaHighGrayLevelEmphasis| wavelet | GLSZM        |
| wavelet_HLL_glszm_LargeAreaLowGrayLevelEmphasis  | wavelet | GLSZM        |
| wavelet_HLL_glszm_LowGrayLevelZoneEmphasis      | wavelet | GLSZM        |
| wavelet_HLL_glszm_SizeZoneNonUniformity          | wavelet | GLSZM        |
| wavelet_HLL_glszm_SizeZoneNonUniformityNormalized| wavelet | GLSZM        |
| wavelet_HLL_glszm_SmallAreaEmphasis              | wavelet | GLSZM        |
| wavelet_HLL_glszm_SmallAreaHighGrayLevelEmphasis | wavelet | GLSZM        |
| wavelet_HLL_glszm_SmallAreaLowGrayLevelEmphasis  | wavelet | GLSZM        |
| wavelet_HLL_glszm_ZoneEntropy                    | wavelet | GLSZM        |
wavelet_HLL_glszm_ZonePercentage  wavelet  Texture
Features--GLSZM

wavelet_HLL_glszm_ZoneVariance  wavelet  Texture
Features--GLSZM

wavelet_HLL_gldm_DependenceEntropy  wavelet  Texture
Features--GLDM

wavelet_HLL_gldm_DependenceNonUniformity  wavelet  Texture
Features--GLDM

wavelet_HLL_gldm_DependenceNonUniformityNormalized  wavelet  Texture
Features--GLDM

wavelet_HLL_gldm_DependenceVariance  wavelet  Texture
Features--GLDM

wavelet_HLL_gldm_GrayLevelNonUniformity  wavelet  Texture
Features--GLDM

wavelet_HLL_gldm_GrayLevelVariance  wavelet  Texture
Features--GLDM

wavelet_HLL_gldm_HighGrayLevelEmphasis  wavelet  Texture
Features--GLDM

wavelet_HLL_gldm_LargeDependenceEmphasis  wavelet  Texture
Features--GLDM

wavelet_HLL_gldm_LargeDependenceHighGrayLevelEmphasis  wavelet  Texture
Features--GLDM

wavelet_HLL_gldm_LargeDependenceLowGrayLevelEmphasis  wavelet  Texture
Features--
| Feature Name                                      | Method         | Type            | Description                     |
|--------------------------------------------------|----------------|-----------------|---------------------------------|
| wavelet_HLL_gldm_LowGrayLevelEmphasis            | wavelet        | Texture Features | GLDM                            |
| wavelet_HLL_gldm_SmallDependenceEmphasis         | wavelet        | Texture Features | GLDM                            |
| wavelet_HLL_gldm_SmallDependenceHighGrayLevelEmphasis | wavelet        | Texture Features | GLDM                            |
| wavelet_HLL_gldm_SmallDependenceLowGrayLevelEmphasis | wavelet        | Texture Features | GLDM                            |
| wavelet_HLL_ngtdm_Busyness                       | wavelet        | Texture Features | NGTDM                           |
| wavelet_HLL_ngtdm_Coarseness                    | wavelet        | Texture Features | NGTDM                           |
| wavelet_HLL_ngtdm_Complexity                    | wavelet        | Texture Features | NGTDM                           |
| wavelet_HLL_ngtdm_Contrast                      | wavelet        | Texture Features | NGTDM                           |
| wavelet_HLL_ngtdm_Strength                      | wavelet        | Texture Features | NGTDM                           |
| wavelet_HLH_firstorder_10Percentile             | wavelet        | First Order Features | GLDM                            |
| wavelet_HLH_firstorder_90Percentile             | wavelet        | First Order Features | GLDM                            |
| wavelet_HLH_firstorder_Energy                   | wavelet        | First Order Features | GLDM                            |
| Feature Name                      | Type   | Order |
|----------------------------------|--------|-------|
| wavelet_HLH_firstorder_Entropy   | wavelet| First  |
| wavelet_HLH_firstorder_InterquartileRange | wavelet| First  |
| wavelet_HLH_firstorder_Kurtosis  | wavelet| First  |
| wavelet_HLH_firstorder_Maximum   | wavelet| First  |
| wavelet_HLH_firstorder_MeanAbsoluteDeviation | wavelet| First  |
| wavelet_HLH_firstorder_Mean      | wavelet| First  |
| wavelet_HLH_firstorder_Median    | wavelet| First  |
| wavelet_HLH_firstorder_Minimum   | wavelet| First  |
| wavelet_HLH_firstorder_Range     | wavelet| First  |
| wavelet_HLH_firstorder_RobustMeanAbsoluteDeviation | wavelet| First  |
| wavelet_HLH_firstorder_RootMeanSquared | wavelet| First  |
| wavelet_HLH_firstorder_Skewness  | wavelet| First  |
| wavelet_HLH_firstorder_TotalEnergy | wavelet| First  |
| wavelet_HLH_firstorder_Uniformity | wavelet| First  |
| wavelet_HLH_firstorder_Variance  | wavelet| First  |
| Feature Name                        | Type    | Description          |
|------------------------------------|---------|----------------------|
| wavelet_HLH_glc_HLH_glcm_Autocorr | wavelet | Texture Features--GLCM |
| wavelet_HLH_glc_HLH_glcm_JointAvg | wavelet | Texture Features--GLCM |
| wavelet_HLH_glc_HLH_glcm_ClusterPr | wavelet | Texture Features--GLCM |
| wavelet_HLH_glc_HLH_glcm_ClusterShade | wavelet | Texture Features--GLCM |
| wavelet_HLH_glc_HLH_glcm_ClusterTendency | wavelet | Texture Features--GLCM |
| wavelet_HLH_glc_HLH_glcm_Contrast | wavelet | Texture Features--GLCM |
| wavelet_HLH_glc_HLH_glcm_Correlation | wavelet | Texture Features--GLCM |
| wavelet_HLH_glc_HLH_glcm_DiffAv    | wavelet | Texture Features--GLCM |
| wavelet_HLH_glc_HLH_glcm_DiffEn    | wavelet | Texture Features--GLCM |
| wavelet_HLH_glc_HLH_glcm_DiffVar   | wavelet | Texture Features--GLCM |
| wavelet_HLH_glc_HLH_glcm_JntEner   | wavelet | Texture Features--GLCM |
| wavelet_HLH_glc_HLH_glcm_JntEnt    | wavelet | Texture Features--GLCM |
| wavelet_HLH_glc_HLH_glcm_Imc1      | wavelet | Texture Features--GLCM |
| wavelet_HLH_glc_HLH_glcm_Imc2      | wavelet | Texture Features--GLCM |
| wavelet_HLH_glc_HLH_glcm_Idm       | wavelet | Texture Features--GLCM |
wavelet_HLH_glcem_Idmn  wavelet  Texture Features--GLCM

wavelet_HLH_glcem_Id  wavelet  Texture Features--GLCM

wavelet_HLH_glcem_Idn  wavelet  Texture Features--GLCM

wavelet_HLH_glcem_InverseVariance  wavelet  Texture Features--GLCM

wavelet_HLH_glcem_MaximumProbability  wavelet  Texture Features--GLCM

wavelet_HLH_glcem_SumEntropy  wavelet  Texture Features--GLCM

wavelet_HLH_glcem_SumSquares  wavelet  Texture Features--GLCM

wavelet_HLH_glrIrm_GrayLevelNonUniformity  wavelet  Texture Features--GLRLM

wavelet_HLH_glrIrm_GrayLevelNonUniformityNormalized  wavelet  Texture Features--GLRLM

wavelet_HLH_glrIrm_GrayLevelVariance  wavelet  Texture Features--GLRLM

wavelet_HLH_glrIrm_HighGrayLevelRunEmphasis  wavelet  Texture Features--GLRLM

wavelet_HLH_glrIrm_LongRunEmphasis  wavelet  Texture Features--GLRLM

wavelet_HLH_glrIrm_LongRunHighGrayLevelEmphasis  wavelet  Texture Features--GLRLM
| Feature Name                                      | Method | Texture Features |
|--------------------------------------------------|--------|------------------|
| wavelet_HLH_gllrm_LongRunLowGrayLevelEmphasis   | wavelet| GLRLM            |
| wavelet_HLH_gllrm_LowGrayLevelRunEmphasis       | wavelet| GLRLM            |
| wavelet_HLH_gllrm_RunEntropy                     | wavelet| GLRLM            |
| wavelet_HLH_gllrm_RunLengthNonUniformity         | wavelet| GLRLM            |
| wavelet_HLH_gllrm_RunLengthNonUniformityNormalized | wavelet| GLRLM            |
| wavelet_HLH_gllrm_RunPercentage                  | wavelet| GLRLM            |
| wavelet_HLH_gllrm_RunVariance                    | wavelet| GLRLM            |
| wavelet_HLH_gllrm_ShortRunEmphasis               | wavelet| GLRLM            |
| wavelet_HLH_gllrm_ShortRunHighGrayLevelEmphasis  | wavelet| GLRLM            |
| wavelet_HLH_gllrm_ShortRunLowGrayLevelEmphasis   | wavelet| GLRLM            |
| wavelet_HLH_glszm_GrayLevelNonUniformity         | wavelet| GLSZM            |
| wavelet_HLH_glszm_GrayLevelNonUniformityNormalized | wavelet| GLSZM            |
| Feature Name                                           | Type   | Description                          |
|--------------------------------------------------------|--------|--------------------------------------|
| wavelet_HLH_glszm_GrayLevelVariance                    | wavelet| Texture Features -- GLSZM            |
| wavelet_HLH_glszm_HighGrayLevelZoneEmphasis           | wavelet| Texture Features -- GLSZM            |
| wavelet_HLH_glszm_LargeAreaEmphasis                   | wavelet| Texture Features -- GLSZM            |
| wavelet_HLH_glszm_LargeAreaHighGrayLevelEmphasis      | wavelet| Texture Features -- GLSZM            |
| wavelet_HLH_glszm_LargeAreaLowGrayLevelEmphasis       | wavelet| Texture Features -- GLSZM            |
| wavelet_HLH_glszm_LowGrayLevelZoneEmphasis            | wavelet| Texture Features -- GLSZM            |
| wavelet_HLH_glszm_SizeZoneNonUniformity               | wavelet| Texture Features -- GLSZM            |
| wavelet_HLH_glszm_SizeZoneNonUniformityNormalized     | wavelet| Texture Features -- GLSZM            |
| wavelet_HLH_glszm_SmallAreaEmphasis                   | wavelet| Texture Features -- GLSZM            |
| wavelet_HLH_glszm_SmallAreaHighGrayLevelEmphasis      | wavelet| Texture Features -- GLSZM            |
| wavelet_HLH_glszm_SmallAreaLowGrayLevelEmphasis       | wavelet| Texture Features -- GLSZM            |
| wavelet_HLH_glszm_ZoneEntropy                          | wavelet| Texture Features -- GLSZM            |
| Feature                                      | Method       | GLSZM                      |
|----------------------------------------------|--------------|----------------------------|
| wavelet_HLH_glszm_ZonePercentage             | wavelet      | Texture Features--GLSZM    |
| wavelet_HLH_glszm_ZoneVariance               | wavelet      | GLSZM                      |
| wavelet_HLH_gldm_DependenceEntropy           | wavelet      | GLDM                       |
| wavelet_HLH_gldm_DependenceNonUniformity     | wavelet      | GLDM                       |
| wavelet_HLH_gldm_DependenceNonUniformityNormalized | wavelet  | GLDM                       |
| wavelet_HLH_gldm_DependenceVariance          | wavelet      | GLDM                       |
| wavelet_HLH_gldm_GrayLevelNonUniformity      | wavelet      | GLDM                       |
| wavelet_HLH_gldm_GrayLevelVariance           | wavelet      | GLDM                       |
| wavelet_HLH_gldm_HighGrayLevelEmphasis       | wavelet      | GLDM                       |
| wavelet_HLH_gldm_LargeDependenceEmphasis     | wavelet      | GLDM                       |
| wavelet_HLH_gldm_LargeDependenceHighGrayLevelEmphasis | wavelet  | GLDM                       |
| wavelet_HLH_gldm_LargeDependenceLowGrayLevelEmphasis | wavelet  | GLDM                       |
| Feature Name                                      | Feature Type       | Feature Category                  | Methodology       |
|--------------------------------------------------|--------------------|-----------------------------------|-------------------|
| wavelet_HLH_gldm_LowGrayLevelEmphasis            | wavelet            | Texture Features - GLDM           |                   |
| wavelet_HLH_gldm_SmallDependenceEmphasis         | wavelet            | Texture Features - GLDM           |                   |
| wavelet_HLH_gldm_SmallDependenceHighGrayLevelEmphasis | wavelet            | Texture Features - GLDM           |                   |
| wavelet_HLH_gldm_SmallDependenceLowGrayLevelEmphasis | wavelet            | Texture Features - GLDM           |                   |
| wavelet_HLH_ngtdm_Busyness                       | wavelet            | Texture Features - NGTDM          |                   |
| wavelet_HLH_ngtdm_Coarseness                     | wavelet            | Texture Features - NGTDM          |                   |
| wavelet_HLH_ngtdm_Complexity                     | wavelet            | Texture Features - NGTDM          |                   |
| wavelet_HLH_ngtdm_Contrast                       | wavelet            | Texture Features - NGTDM          |                   |
| wavelet_HLH_ngtdm_Strength                       | wavelet            | Texture Features - NGTDM          |                   |
| wavelet_HHL_firstorder_10Percentile              | wavelet            | First Order Features              |                   |
| wavelet_HHL_firstorder_90Percentile              | wavelet            | First Order Features              |                   |
| wavelet_HHL_firstorder_Energy                    | wavelet            | First Order Features              |                   |
| Feature Name                                      | Category          | Description          |
|--------------------------------------------------|-------------------|----------------------|
| wavelet_HHL_firstorder_Entropy                   | wavelet           | First Order Features |
| wavelet_HHL_firstorder_InterquartileRange        | wavelet           | First Order Features |
| wavelet_HHL_firstorder_Kurtosis                  | wavelet           | First Order Features |
| wavelet_HHL_firstorder_Maximum                   | wavelet           | First Order Features |
| wavelet_HHL_firstorder_MeanAbsoluteDeviation     | wavelet           | First Order Features |
| wavelet_HHL_firstorder_Mean                      | wavelet           | First Order Features |
| wavelet_HHL_firstorder_Median                    | wavelet           | First Order Features |
| wavelet_HHL_firstorder_Minimum                   | wavelet           | First Order Features |
| wavelet_HHL_firstorder_Range                     | wavelet           | First Order Features |
| wavelet_HHL_firstorder_RobustMeanAbsoluteDeviation | wavelet           | First Order Features |
| wavelet_HHL_firstorder_RootMeanSquared           | wavelet           | First Order Features |
| wavelet_HHL_firstorder_Skewness                  | wavelet           | First Order Features |
| wavelet_HHL_firstorder_TotalEnergy               | wavelet           | First Order Features |
| wavelet_HHL_firstorder_Uniformity                | wavelet           | First Order Features |
| wavelet_HHL_firstorder_Variance                  | wavelet           | First Order Features |
| wavelet_HHL_glcm_Autocorrelation | wavelet | Texture Features--GLCM |
|----------------------------------|---------|------------------------|
| wavelet_HHL_glcm_JointAverage    | wavelet | Texture Features--GLCM |
| wavelet_HHL_glcm_ClusterProminence | wavelet | Texture Features--GLCM |
| wavelet_HHL_glcm_ClusterShade    | wavelet | Texture Features--GLCM |
| wavelet_HHL_glcm_ClusterTendency | wavelet | Texture Features--GLCM |
| wavelet_HHL_glcm_Contrast        | wavelet | Texture Features--GLCM |
| wavelet_HHL_glcm_Correlation     | wavelet | Texture Features--GLCM |
| wavelet_HHL_glcm_DifferenceAverage | wavelet | Texture Features--GLCM |
| wavelet_HHL_glcm_DifferenceEntropy | wavelet | Texture Features--GLCM |
| wavelet_HHL_glcm_DifferenceVariance | wavelet | Texture Features--GLCM |
| wavelet_HHL_glcm_JointEnergy     | wavelet | Texture Features--GLCM |
| wavelet_HHL_glcm_JointEntropy    | wavelet | Texture Features--GLCM |
| wavelet_HHL_glcm_Imc1            | wavelet | Texture Features--GLCM |
| wavelet_HHL_glcm_Imc2            | wavelet | Texture Features--GLCM |
| wavelet_HHL_glcm_Idm             | wavelet | Texture Features--GLCM |
| Feature Name                               | Method | Feature Type |
|-------------------------------------------|--------|--------------|
| wavelet_HHL_glcm_Idmn                     | wavelet| Texture Features--GLCM |
| wavelet_HHL_glcm_Id                      | wavelet| Texture Features--GLCM |
| wavelet_HHL_glcm_Idn                     | wavelet| Texture Features--GLCM |
| wavelet_HHL_glcm_InverseVariance         | wavelet| Texture Features--GLCM |
| wavelet_HHL_glcm_MaximumProbability      | wavelet| Texture Features--GLCM |
| wavelet_HHL_glcm_SumEntropy              | wavelet| Texture Features--GLCM |
| wavelet_HHL_glcm_SumSquares              | wavelet| Texture Features--GLCM |
| wavelet_HHL_glrlm_GrayLevelNonUniformity | wavelet| Texture Features--GLRLM |
| wavelet_HHL_glrlm_GrayLevelNonUniformityNormalized | wavelet| Texture Features--GLRLM |
| wavelet_HHL_glrlm_GrayLevelVariance      | wavelet| Texture Features--GLRLM |
| wavelet_HHL_glrlm_HighGrayLevelRunEmphasis | wavelet| Texture Features--GLRLM |
| wavelet_HHL_glrlm_LongRunEmphasis        | wavelet| Texture Features--GLRLM |
| wavelet_HHL_glrlm_LongRunHighGrayLevelEmphasis | wavelet| Texture Features--GLRLM |
| wavelet_HHL_glrlm_LongRunLowGrayLevelEmphasis | wavelet| Texture Features--GLRLM |
| Wavelet_HHL_grlm_LowGrayLevelRunEmphasis | Wavelet Feature | GLRLM |
|-----------------------------------------|---------------|-------|
| Wavelet_HHL_grlm_RunEntropy            | Wavelet Feature | GLRLM |
| Wavelet_HHL_grlm_RunLengthNonUniformity | Wavelet Feature | GLRLM |
| Wavelet_HHL_grlm_RunLengthNonUniformityNormalized | Wavelet Feature | GLRLM |
| Wavelet_HHL_grlm_RunPercentage         | Wavelet Feature | GLRLM |
| Wavelet_HHL_grlm_RunVariance           | Wavelet Feature | GLRLM |
| Wavelet_HHL_grlm_ShortRunEmphasis     | Wavelet Feature | GLRLM |
| Wavelet_HHL_grlm_ShortRunHighGrayLevelEmphasis | Wavelet Feature | GLRLM |
| Wavelet_HHL_grlm_ShortRunLowGrayLevelEmphasis | Wavelet Feature | GLRLM |
| Wavelet_HHL_glszm_GrayLevelNonUniformity | Wavelet Feature | GLSZM |
| Wavelet_HHL_glszm_GrayLevelNonUniformityNormalized | Wavelet Feature | GLSZM |
| Feature Name                                      | Technique     | Feature Category |
|--------------------------------------------------|---------------|------------------|
| wavelet_HHL_glszm_GrayLevelVariance              | wavelet       | Texture GLSZM    |
| wavelet_HHL_glszm_HighGrayLevelZoneEmphasis     | wavelet       | Texture GLSZM    |
| wavelet_HHL_glszm_LargeAreaEmphasis             | wavelet       | Texture GLSZM    |
| wavelet_HHL_glszm_LargeAreaHighGrayLevelEmphasis| wavelet       | Texture GLSZM    |
| wavelet_HHL_glszm_LargeAreaLowGrayLevelEmphasis  | wavelet       | Texture GLSZM    |
| wavelet_HHL_glszm_LowGrayLevelZoneEmphasis      | wavelet       | Texture GLSZM    |
| wavelet_HHL_glszm_SizeZoneNonUniformity         | wavelet       | Texture GLSZM    |
| wavelet_HHL_glszm_SizeZoneNonUniformityNormalized| wavelet      | Texture GLSZM    |
| wavelet_HHL_glszm_SmallAreaEmphasis             | wavelet       | Texture GLSZM    |
| wavelet_HHL_glszm_SmallAreaHighGrayLevelEmphasis| wavelet       | Texture GLSZM    |
| wavelet_HHL_glszm_SmallAreaLowGrayLevelEmphasis | wavelet       | Texture GLSZM    |
| wavelet_HHL_glszm_ZoneEntropy                    | wavelet       | Texture GLSZM    |
| Feature Name                          | Wavelet Method | Texture Features |
|--------------------------------------|----------------|------------------|
| wavelet_HHL_glszm_ZonePercentage     | wavelet        | GLSZM            |
| wavelet_HHL_glszm_ZoneVariance       | wavelet        | GLSZM            |
| wavelet_HHL_gldm_DependenceEntropy  | wavelet        | GLDM             |
| wavelet_HHL_gldm_DependenceNonUniformity | wavelet       | GLDM             |
| wavelet_HHL_gldm_DependenceNonUniformityNormalized | wavelet | GLDM             |
| wavelet_HHL_gldm_DependenceVariance  | wavelet        | GLDM             |
| wavelet_HHL_gldm_GrayLevelNonUniformity | wavelet        | GLDM             |
| wavelet_HHL_gldm_GrayLevelVariance   | wavelet        | GLDM             |
| wavelet_HHL_gldm_HighGrayLevelEmphasis | wavelet        | GLDM             |
| wavelet_HHL_gldm_LargeDependenceEmphasis | wavelet        | GLDM             |
| wavelet_HHL_gldm_LargeDependenceHighGrayLevelEmphasis | wavelet | GLDM             |
| wavelet_HHL_gldm_LargeDependenceLowGrayLevelEmphasis | wavelet | GLDM             |
| Feature Name                                               | Method  | Feature Type                        |
|------------------------------------------------------------|---------|-------------------------------------|
| wavelet_HHL_gldm_LowGrayLevelEmphasis                     | wavelet | Texture Features--GLDM             |
| wavelet_HHL_gldm_SmallDependenceEmphasis                  | wavelet | Texture Features--GLDM             |
| wavelet_HHL_gldm_SmallDependenceHighGrayLevelEmphasis    | wavelet | Texture Features--GLDM             |
| wavelet_HHL_gldm_SmallDependenceLowGrayLevelEmphasis     | wavelet | Texture Features--GLDM             |
| wavelet_HHL_ngtdm_Busyness                                | wavelet | Texture Features--NGTDM            |
| wavelet_HHL_ngtdm_Coarseness                              | wavelet | Texture Features--NGTDM            |
| wavelet_HHL_ngtdm_Complexity                              | wavelet | Texture Features--NGTDM            |
| wavelet_HHL_ngtdm_Contrast                                | wavelet | Texture Features--NGTDM            |
| wavelet_HHL_ngtdm_Strength                                | wavelet | Texture Features--NGTDM            |
| wavelet_HHH_firstorder_10Percentile                       | wavelet | First Order Features               |
| wavelet_HHH_firstorder_90Percentile                       | wavelet | First Order Features               |
| wavelet_HHH_firstorder_Energy                             | wavelet | First Order Features               |
| Feature Name                          | Type         | Order         | Features     |
|--------------------------------------|--------------|---------------|--------------|
| wavelet_HHH_firstorder_Entropy       | wavelet      | First         | Order        |
| wavelet_HHH_firstorder_InterquartileRange | wavelet      | First         | Order        |
| wavelet_HHH_firstorder_Kurtosis      | wavelet      | First         | Order        |
| wavelet_HHH_firstorder_Maximum       | wavelet      | First         | Order        |
| wavelet_HHH_firstorder_MeanAbsoluteDeviation | wavelet      | First         | Order        |
| wavelet_HHH_firstorder_Mean          | wavelet      | First         | Order        |
| wavelet_HHH_firstorder_Median        | wavelet      | First         | Order        |
| wavelet_HHH_firstorder_Minimum       | wavelet      | First         | Order        |
| wavelet_HHH_firstorder_Range         | wavelet      | First         | Order        |
| wavelet_HHH_firstorder_RobustMeanAbsoluteDeviation | wavelet      | First         | Order        |
| wavelet_HHH_firstorder_RootMeanSquared | wavelet      | First         | Order        |
| wavelet_HHH_firstorder_Skewness      | wavelet      | First         | Order        |
| wavelet_HHH_firstorder_TotalEnergy   | wavelet      | First         | Order        |
| wavelet_HHH_firstorder_Uniformity    | wavelet      | First         | Order        |
| wavelet_HHH_firstorder_Variance      | wavelet      | First         | Order        |
| Feature Name                                      | Wavelet | Texture Features--GLCM |
|--------------------------------------------------|---------|------------------------|
| wavelet_HHH_glem_Autocorrelation                 | wavelet | Texture Features--GLCM |
| wavelet_HHH_glem_JointAverage                    | wavelet | Texture Features--GLCM |
| wavelet_HHH_glem_ClusterProminence               | wavelet | Texture Features--GLCM |
| wavelet_HHH_glem_ClusterShade                    | wavelet | Texture Features--GLCM |
| wavelet_HHH_glem_ClusterTendency                 | wavelet | Texture Features--GLCM |
| wavelet_HHH_glem_Contrast                        | wavelet | Texture Features--GLCM |
| wavelet_HHH_glem_Correlation                     | wavelet | Texture Features--GLCM |
| wavelet_HHH_glem_DifferenceAverage               | wavelet | Texture Features--GLCM |
| wavelet_HHH_glem_DifferenceEntropy               | wavelet | Texture Features--GLCM |
| wavelet_HHH_glem_DifferenceVariance              | wavelet | Texture Features--GLCM |
| wavelet_HHH_glem_JointEnergy                     | wavelet | Texture Features--GLCM |
| wavelet_HHH_glem_JointEntropy                    | wavelet | Texture Features--GLCM |
| wavelet_HHH_glem_Idc1                             | wavelet | Texture Features--GLCM |
| wavelet_HHH_glem_Idc2                             | wavelet | Texture Features--GLCM |
| wavelet_HHH_glem_Idm                              | wavelet | Texture Features--GLCM |
| Name                                      | Type      | Features          |
|-------------------------------------------|-----------|-------------------|
| wavelet_HHH_glcm_Idmn                    | wavelet   | Texture--GLCM     |
| wavelet_HHH_glcm_Id                      | wavelet   | Texture--GLCM     |
| wavelet_HHH_glcm_Idn                     | wavelet   | Texture--GLCM     |
| wavelet_HHH_glcm_InverseVariance         | wavelet   | Texture--GLCM     |
| wavelet_HHH_glcm_MaximumProbability      | wavelet   | Texture--GLCM     |
| wavelet_HHH_glcm_SumEntropy              | wavelet   | Texture--GLCM     |
| wavelet_HHH_glcm_SumSquares              | wavelet   | Texture--GLCM     |
| wavelet_HHH_glrlm_GrayLevelNonUniformity | wavelet   | Texture--GLRLM    |
| wavelet_HHH_glrlm_GrayLevelNonUniformityNormalized | wavelet | Texture--GLRLM |
| wavelet_HHH_glrlm_GrayLevelVariance      | wavelet   | Texture--GLRLM    |
| wavelet_HHH_glrlm_HighGrayLevelRunEmphasis | wavelet | Texture--GLRLM |
| wavelet_HHH_glrlm_LongRunEmphasis        | wavelet   | Texture--GLRLM    |
| wavelet_HHH_glrlm_LongRunHighGrayLevelEmphasis | wavelet | Texture--GLRLM |
| Feature Name                                                   | Type   | Texture Features--GLRLM                                                                 |
|---------------------------------------------------------------|--------|---------------------------------------------------------------------------------------|
| wavelet_HHH_grrlm_LongRunLowGrayLevelEmphasis                 | wavelet| Textures Features--GLRLM                                                              |
| wavelet_HHH_grrlm_LowGrayLevelRunEmphasis                    | wavelet| Textures Features--GLRLM                                                              |
| wavelet_HHH_grrlm_RunEntropy                                 | wavelet| Textures Features--GLRLM                                                              |
| wavelet_HHH_grrlm_RunLengthNonUniformity                     | wavelet| Textures Features--GLRLM                                                              |
| wavelet_HHH_grrlm_RunLengthNonUniformityNormalized           | wavelet| Textures Features--GLRLM                                                              |
| wavelet_HHH_grrlm_RunPercentage                              | wavelet| Textures Features--GLRLM                                                              |
| wavelet_HHH_grrlm_RunVariance                                | wavelet| Textures Features--GLRLM                                                              |
| wavelet_HHH_grrlm_ShortRunEmphasis                           | wavelet| Textures Features--GLRLM                                                              |
| wavelet_HHH_grrlm_ShortRunHighGrayLevelEmphasis              | wavelet| Textures Features--GLRLM                                                              |
| wavelet_HHH_grrlm_ShortRunLowGrayLevelEmphasis               | wavelet| Textures Features--GLRLM                                                              |
| wavelet_HHH_glszm_GrayLevelNonUniformity                     | wavelet| Textures Features--GLSZM                                                              |
| wavelet_HHH_glszm_GrayLevelNonUniformityNormalized           | wavelet| Textures Features--GLSZM                                                              |
| Feature Name                                      | Type          | Description                  |
|--------------------------------------------------|---------------|------------------------------|
| wavelet_HHH_glszm_GrayLevelVariance              | wavelet       | Texture Features--GLSZM      |
| wavelet_HHH_glszm_HighGrayLevelZoneEmphasis     | wavelet       | Texture Features--GLSZM      |
| wavelet_HHH_glszm_LargeAreaEmphasis             | wavelet       | Texture Features--GLSZM      |
| wavelet_HHH_glszm_LargeAreaHighGrayLevelEmphasis| wavelet       | Texture Features--GLSZM      |
| wavelet_HHH_glszm_LargeAreaLowGrayLevelEmphasis | wavelet       | Texture Features--GLSZM      |
| wavelet_HHH_glszm_LowGrayLevelZoneEmphasis      | wavelet       | Texture Features--GLSZM      |
| wavelet_HHH_glszm_SizeZoneNonUniformity         | wavelet       | Texture Features--GLSZM      |
| wavelet_HHH_glszm_SizeZoneNonUniformityNormalized| wavelet       | Texture Features--GLSZM      |
| wavelet_HHH_glszm_SmallAreaEmphasis             | wavelet       | Texture Features--GLSZM      |
| wavelet_HHH_glszm_SmallAreaHighGrayLevelEmphasis| wavelet       | Texture Features--GLSZM      |
| wavelet_HHH_glszm_SmallAreaLowGrayLevelEmphasis | wavelet       | Texture Features--GLSZM      |
| wavelet_HHH_glszm_ZoneEntropy                    | wavelet       | Texture Features--GLSZM      |
| Feature Name | Wavelet Texture Features | GLSZM |
|--------------|--------------------------|-------|
| wavelet_HHH_glszm_ZonePercentage | wavelet Texture Features--GLSZM |
| wavelet_HHH_glszm_ZoneVariance | wavelet Texture Features--GLSZM |
| wavelet_HHH_gldm_DependenceEntropy | wavelet Texture Features--GLDM |
| wavelet_HHH_gldm_DependenceNonUniformity | wavelet Texture Features--GLDM |
| wavelet_HHH_gldm_DependenceNonUniformityNormalized | wavelet Texture Features--GLDM |
| wavelet_HHH_gldm_DependenceVariance | wavelet Texture Features--GLDM |
| wavelet_HHH_gldm_GrayLevelNonUniformity | wavelet Texture Features--GLDM |
| wavelet_HHH_gldm_GrayLevelVariance | wavelet Texture Features--GLDM |
| wavelet_HHH_gldm_HighGrayLevelEmphasis | wavelet Texture Features--GLDM |
| wavelet_HHH_gldm_LargeDependenceEmphasis | wavelet Texture Features--GLDM |
| wavelet_HHH_gldm_LargeDependenceHighGrayLevelEmphasis | wavelet Texture Features--GLDM |
| wavelet_HHH_gldm_LargeDependenceLowGrayLevelEmphasis | wavelet Texture Features--GLDM |
| Feature Name                                      | Wavelet Type | Texture Feature Type |
|--------------------------------------------------|--------------|----------------------|
| wavelet_HHH_gldm_LowGrayLevelEmphasis            | wavelet      | GLDM                 |
| wavelet_HHH_gldm_SmallDependenceEmphasis         | wavelet      | GLDM                 |
| wavelet_HHH_gldm_SmallDependenceHighGrayLevelEmphasis | wavelet      | GLDM                 |
| wavelet_HHH_gldm_SmallDependenceLowGrayLevelEmphasis | wavelet      | GLDM                 |
| wavelet_HHH_ngtdm_Busyness                        | wavelet      | NGTDM                |
| wavelet_HHH_ngtdm_Coarseness                      | wavelet      | NGTDM                |
| wavelet_HHH_ngtdm_Complexity                      | wavelet      | NGTDM                |
| wavelet_HHH_ngtdm_Contrast                        | wavelet      | NGTDM                |
| wavelet_HHH_ngtdm_Strength                        | wavelet      | NGTDM                |
| wavelet_LLL_firstorder_10Percentile              | wavelet      | First Order          |
| wavelet_LLL_firstorder_90Percentile              | wavelet      | First Order          |
| wavelet_LLL_firstorder_Energy                     | wavelet      | First Order          |
| Feature Name                                      | Domain  | Type             |
|--------------------------------------------------|---------|------------------|
| wavelet_LLL_firstorder_Entropy                   | wavelet | First Order      |
| wavelet_LLL_firstorder_InterquartileRange        | wavelet | First Order      |
| wavelet_LLL_firstorder_Kurtosis                  | wavelet | First Order      |
| wavelet_LLL_firstorder_Maximum                   | wavelet | First Order      |
| wavelet_LLL_firstorder_MeanAbsoluteDeviation     | wavelet | First Order      |
| wavelet_LLL_firstorder_Mean                      | wavelet | First Order      |
| wavelet_LLL_firstorder_Median                    | wavelet | First Order      |
| wavelet_LLL_firstorder_Minimum                   | wavelet | First Order      |
| wavelet_LLL_firstorder_Range                     | wavelet | First Order      |
| wavelet_LLL_firstorder_RobustMeanAbsoluteDeviation | wavelet | First Order      |
| wavelet_LLL_firstorder_RootMeanSquared           | wavelet | First Order      |
| wavelet_LLL_firstorder_Skewness                  | wavelet | First Order      |
| wavelet_LLL_firstorder_TotalEnergy               | wavelet | First Order      |
| wavelet_LLL_firstorder_Uniformity                | wavelet | First Order      |
| wavelet_LLL_firstorder_Variance                  | wavelet | First Order      |
Supplementary Material

| Feature Name                          | Feature Type | Description     |
|---------------------------------------|--------------|-----------------|
| wavelet_LLL_glcm_Autocorrelation      | wavelet      | Texture Features--GLCM |
| wavelet_LLL_glcm_JointAverage         | wavelet      | Texture Features--GLCM |
| wavelet_LLL_glcm_ClusterProminence    | wavelet      | Texture Features--GLCM |
| wavelet_LLL_glcm_ClusterShade         | wavelet      | Texture Features--GLCM |
| wavelet_LLL_glcm_ClusterTendency      | wavelet      | Texture Features--GLCM |
| wavelet_LLL_glcm_Contrast             | wavelet      | Texture Features--GLCM |
| wavelet_LLL_glcm_Correlation          | wavelet      | Texture Features--GLCM |
| wavelet_LLL_glcm_DifferenceAverage    | wavelet      | Texture Features--GLCM |
| wavelet_LLL_glcm_DifferenceEntropy    | wavelet      | Texture Features--GLCM |
| wavelet_LLL_glcm_DifferenceVariance   | wavelet      | Texture Features--GLCM |
| wavelet_LLL_glcm_JointEnergy          | wavelet      | Texture Features--GLCM |
| wavelet_LLL_glcm_JointEntropy         | wavelet      | Texture Features--GLCM |
| wavelet_LLL_glcm_Idm                  | wavelet      | Texture Features--GLCM |
| Feature Name                        | Method     | Feature Type      |
|------------------------------------|------------|-------------------|
| wavelet_LLL_glcM_Idmn              | wavelet    | Texture           |
| wavelet_LLL_glcM_Id                | wavelet    | Texture           |
| wavelet_LLL_glcM_Idn               | wavelet    | Texture           |
| wavelet_LLL_glcM_InverseVariance   | wavelet    | Texture           |
| wavelet_LLL_glcM_MaximumProbability| wavelet    | Texture           |
| wavelet_LLL_glcM_SumEntropy        | wavelet    | Texture           |
| wavelet_LLL_glcM_SumSquares        | wavelet    | Texture           |
| wavelet_LLL_grlM_GrayLevelNonUniformity | wavelet | Texture           |
| wavelet_LLL_grlM_GrayLevelNonUniformityNormalized | wavelet | Texture           |
| wavelet_LLL_grlM_GrayLevelVariance | wavelet    | Texture           |
| wavelet_LLL_grlM_HighGrayLevelRunEmphasis | wavelet | Texture           |
| wavelet_LLL_grlM_LongRunEmphasis   | wavelet    | Texture           |
| wavelet_LLL_grlM_LongRunHighGrayLevelEmphasis | wavelet | Texture           |
| wavelet_LLL_grlM_LongRunLowGrayLevelEmphasis | wavelet | Texture           |
| Feature                          | Wavelet | Texture Features | GLRLM          |
|---------------------------------|---------|------------------|----------------|
| wavelet_LLL_grlm_LowGrayLevelRunEmphasis | wavelet | GLRLM            |
| wavelet_LLL_grlm_RunEntropy     | wavelet | GLRLM            |
| wavelet_LLL_grlm_RunLengthNonUniformity | wavelet | GLRLM            |
| wavelet_LLL_grlm_RunLengthNonUniformityNormalized | wavelet | GLRLM            |
| wavelet_LLL_grlm_RunPercentage  | wavelet | GLRLM            |
| wavelet_LLL_grlm_RunVariance    | wavelet | GLRLM            |
| wavelet_LLL_grlm_ShortRunEmphasis | wavelet | GLRLM            |
| wavelet_LLL_grlm_ShortRunHighGrayLevelEmphasis | wavelet | GLRLM            |
| wavelet_LLL_grlm_ShortRunLowGrayLevelEmphasis | wavelet | GLRLM            |
| wavelet_LLL_glszm_GrayLevelNonUniformity | wavelet | GLS73M          |
| wavelet_LLL_glszm_GrayLevelNonUniformityNormalized | wavelet | GLS73M          |
| Feature Name                                           | Wavelet | Texture Features |
|--------------------------------------------------------|---------|-----------------|
| wavelet_LLL_glszm_GrayLevelVariance                    | wavelet | GLSZM           |
| wavelet_LLL_glszm_HighGrayLevelZoneEmphasis            | wavelet | GLSZM           |
| wavelet_LLL_glszm_LargeAreaEmphasis                    | wavelet | GLSZM           |
| wavelet_LLL_glszm_LargeAreaHighGrayLevelEmphasis      | wavelet | GLSZM           |
| wavelet_LLL_glszm_LargeAreaLowGrayLevelEmphasis       | wavelet | GLSZM           |
| wavelet_LLL_glszm_LowGrayLevelZoneEmphasis            | wavelet | GLSZM           |
| wavelet_LLL_glszm_SizeZoneNonUniformity                | wavelet | GLSZM           |
| wavelet_LLL_glszm_SizeZoneNonUniformityNormalized     | wavelet | GLSZM           |
| wavelet_LLL_glszm_SmallAreaEmphasis                    | wavelet | GLSZM           |
| wavelet_LLL_glszm_SmallAreaHighGrayLevelEmphasis      | wavelet | GLSZM           |
| wavelet_LLL_glszm_SmallAreaLowGrayLevelEmphasis       | wavelet | GLSZM           |
| wavelet_LLL_glszm_ZoneEntropy                          | wavelet | GLSZM           |
| Feature Name                                      | Type       | Feature Object | Library |
|--------------------------------------------------|------------|----------------|---------|
| wavelet_LLL_glszm_ZonePercentage                 | wavelet    | Texture        | GLSZM   |
| wavelet_LLL_glszm_ZoneVariance                  | wavelet    | Texture        | GLSZM   |
| wavelet_LLL_gldm_DependenceEntropy              | wavelet    | Texture        | GLDM    |
| wavelet_LLL_gldm_DependenceNonUniformity        | wavelet    | Texture        | GLDM    |
| wavelet_LLL_gldm_DependenceNonUniformityNormalized | wavelet    | Texture        | GLDM    |
| wavelet_LLL_gldm_DependenceVariance             | wavelet    | Texture        | GLDM    |
| wavelet_LLL_gldm_GrayLevelNonUniformity         | wavelet    | Texture        | GLDM    |
| wavelet_LLL_gldm_GrayLevelVariance              | wavelet    | Texture        | GLDM    |
| wavelet_LLL_gldm_HighGrayLevelEmphasis          | wavelet    | Texture        | GLDM    |
| wavelet_LLL_gldm_LargeDependenceEmphasis        | wavelet    | Texture        | GLDM    |
| wavelet_LLL_gldm_LargeDependenceHighGrayLevelEmphasis | wavelet    | Texture        | GLDM    |
| wavelet_LLL_gldm_LargeDependenceLowGrayLevelEmphasis | wavelet    | Texture        | GLDM    |
| feature                                           | coefficients  |
|--------------------------------------------------|---------------|
| original_shape_Maximum2DDiameterRow              | 0.007400704   |
| original_shape_Maximum2DDiameterSlice            | 0.006980187   |
| Feature                                              | Value          |
|------------------------------------------------------|----------------|
| original_firstorder_Median                           | 2.62156E-05    |
| log.sigma.1.0.mm.3D_gldm_DependenceVariance          | 0.003408999    |
| wavelet.LLL_firstorder_Median                        | 0.00107798     |
| wavelet.LLL_firstorder_RootMeanSquared               | -0.000712108   |
| wavelet.LLL_firstorder_Skewness                      | -0.070730226   |
| wavelet.LLL_glcml_Idm                                | -3.317270407   |
| wavelet.LLL_glcml_InverseVariance                    | 1.906724568    |
| wavelet.LLL_glrml_RunLengthNonUniformityNormalized   | -2.688674551   |
| wavelet.LLL_gldm_DependenceVariance                  | 0.02500966     |
Supplementary Figure 1.
The Radiomics workflow of the study.
Supplementary Figure 2.
Radiomics feature selection using the LASSO Cox regression model. (Left), each curve represents the change trajectory of each radiomics feature’s coefficient distribution. The left column is the value of the coefficients, the lower row is $\log(\lambda)$, and the upper row is the number of non-zero coefficients in the model. Dotted vertical lines represents the optimized hyperparameter $\lambda$ by 10-fold cross-validation, which ensured that the model had the minimum deviance. The optimal $\lambda$ is 0.064. (Right) Partial likelihood deviance was generated against the $\log(\lambda)$ sequence. Left dotted vertical line represents the optimal $\lambda$ values by using the 1 standard error of the minimum criteria (the 1-SE criteria), while right dotted vertical line was drawn using the minimum criteria that minimizes the partial log-likelihood deviance.

Supplementary Figure 3.
Kaplan-Meier survival analysis of the patients in the high-risk and low-risk groups in the training cohorts (left) and validation cohorts (right). The median of the radiomics signature in the training cohort was used to stratify patients into low-risk group (radiomics signature <= -0.716) and high-risk group (radiomics signature > -0.716) in the two cohorts. A significant difference in the overall survival was found between the two cohorts ($P$<0.001).
Supplementary Figure 4.
Forest plot with hazard ratios showing univariate Cox regression analyses estimated for association between the clinical variables and overall survival of patients with NSCLC in training cohort.
Supplementary Figure 5.
Kaplan-Meier survival analysis showed significant difference in the overall survival by each clinical factor with a \( P \) value < 0.01 at univariable analysis in the training cohort.
Supplementary Figure 6.
Forest plot with hazard ratios showing multivariate Cox regression analyses estimated for association between the clinical variables and the overall survival of patients with NSCLC in training cohort.
**Supplementary Figure 7.**
Forest plot with hazard ratios showing multivariate Cox regression analyses estimated for association between the clinical variables and the radiomics signature and overall survival of patients with NSCLC in training cohort.
Supplementary Figure 8.
Survival curves of quartiles based on 3-year nomogram predicted risk in training cohort (left) and validation cohort (right).