

LIFEx v7.6.0

Announcement

— LIFEx —

C. Nioche, F. Orlhac, I. Buvat

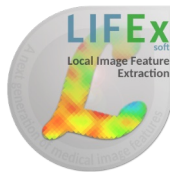


What is new?



LIFEx version 7.6.0

Last update of document: 2024/04/04



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Acknowledgements

Dear LIFEx users,

We are pleased to announce the release of **LIFEx v7.6.0**

We would like to take this opportunity [to thank all 8.000 LIFEx users](#) for their feedback and relevant suggestions. We took into account your comments to enhance the software and produce this version. We hope you will enjoy it.

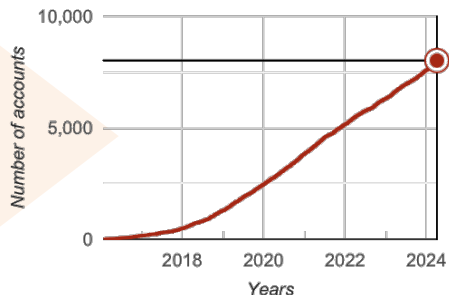
Do not hesitate to download this new release and replace your old LIFEx version. Your feedback will always be welcome.

LIFEx is free of charge.

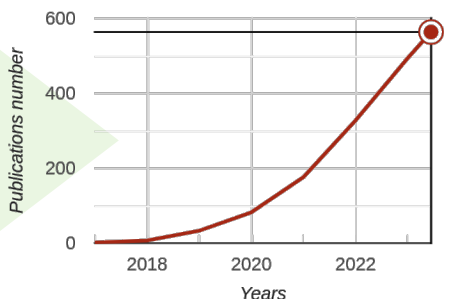
Please help us to keep it free by always quoting the LIFEx reference: (see below)

Please note that the correct reference to be cited is:

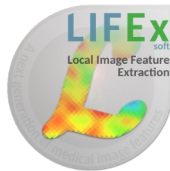
C Nioche, F Orlhac, S Boughdad, S Reuzé, J Goya-Outi, C Robert, C Pellot-Barakat, M Soussan, F Frouin, and I Buvat. LIFEx: a freeware for radiomic feature calculation in multimodality imaging to accelerate advances in the characterization of tumor heterogeneity. Cancer Research 2018; 78(16):4786-4789



Evolution of the number of accounts (from our site web)



Evolution of Publications referencing LIFEx (from PubMed)



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Interface screenshot

Christophe Nioche

The screenshot displays the LIFEx v7.6.0 software interface, which is used for PET image analysis. The main window shows a PET scan of a mouse with various analysis tools and panels.

Top Panel: Shows the current study information: **MTV:1362.1mL**, **Dmax:63.9±0.1cm**. The **Labeling** panel is active, showing **Computer-assisted labelli...** and **MR Perfusion DSC & DCE**. The **Calcium Quantitation** panel is also visible, showing **run** and **Quality Control**.

Left Panel: Contains various tool icons for **File Edit**, **Measure Units**, **Display**, **Operations between series**, and **Tools**. The **INFO** section shows **DICOM fields**. The **PT J V (116111063...)** and **CT J V (116111063...)** panels are visible.

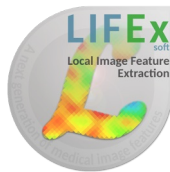
Center Panel: Displays a PET scan of a mouse with various analysis tools. The **Texture Feature Extraction** panel is active, showing **run** and **PT-Perf run**. The **1: Init thresholds** panel is active, showing **Mandatory thresholds applied to all ROIs:** **Absolute SUV threshold =SUV (4.0<->9999.0)**, **Pruning volume = (1.00<->9999.00)cm3**. The **2: Setting thresholds** panel is active, showing **Absolute SUV threshold =SUV (3.4<->9999.0)**, **SUV / liver activity ratio =disabled**, **% of SUVmax threshold =disabled**, **Adaptive threshold =disabled**, **Contrast Based threshold =disabled**. The **3: Volume refinement** panel is active, showing **Pruning volume = (2.20<->9999.00)cm3**. The **Run** panel is active, showing **Generate ROIs** and **Save results**. The **Results** panel shows **TLG: 6884.705 SUV*mL**, **sTLG: 105.919 SUV*mL/Kg**, **MTV: 1362.112 mL**, **sMTV: 20.956 mL/Kg**, **Dmax: 63.934 cm**, **wDmax: 63.920 cm**, **DmaxVox: NaN ±0.1cm**. The **Mag: x1.6** is displayed.

Right Panel: Shows a **REGION OF INTEREST** panel with various icons for **File Edit**, **Measure**, **Create**, and **Threshold**. The **ROIs sorting** panel is active, showing **undo the last ROI deletion** and **ROIs sorting: max mean vol R# alpha**. The **ROIs** list shows **R34** (52.213cm3), **R11** (149.378cm3), **R32** (65.045cm3), **R7** (52.213cm3), **R6** (45.345cm3), **R27** (32.511cm3), **R9** (31.854cm3), **R17** (22.194cm3), **R2** (20.466cm3), **R19** (19.984cm3), **R3** (14.645cm3), **R13** (14.645cm3).

Bottom Panel: Shows the **Actual Frame Duration: 75000.0 ms**, **Radionuclide Total Dose: 203380000 Bq**, **Radionuclide Start Time: 2015-08-18T11:43:00**, **Radionuclide Half Life: 109.8 min**, **W: 4.864 L: 2.367**, **Time (#)**, **Reduce Matrix: 144x144pi**. The **Mag: x1.4** is displayed.



The Laboratory of Translational Imaging in Oncology is a joint research unit supported by Inserm (=French NIH) and Institut Curie, the 1st cancer center in France.



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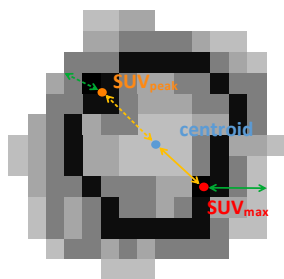
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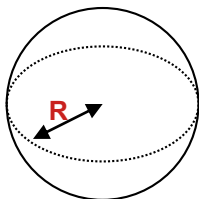
NHOC and NHOP definitions

Narinée Hovhannisyian-Baghdasarian

N. Hovhannisyian-Baghdasarian, M. Luporsi, N. Captier, C. Nioche, V. Cuplov, E. Woff, N. Hegarat, A. Livartowski, N. Girard, I. Buvat, F. Orhac. **New promising candidate prognostic biomarkers in [18F]FDG-PET images: evaluation in independent cohorts of NSCLC patients.** J Nucl Med 2024 in press



A Tumor
(black is high SUV, white is low SUV)



B Hypothetical sphere of radius R
having the same volume as the tumor

NHOCmax: distance (yellow arrow) from the voxel with maximum SUV (SUVmax, red circle) to the tumor centroid (blue circle) divided (normalized) by the radius (R)

NHOCpeak: normalized distance (yellow dashed arrow) from the hotspot with maximum average SUV (within a 1cm³ spherical volume, SUVpeak, orange circle) to the tumor centroid

NHOPmax: normalized distance (green line) from the SUVmax to the tumor perimeter (closest border)

NHOPpeak: normalized distance (green dashed line) from the SUVpeak to the tumor perimeter

Corresponding LIFEx features:

NHOCmax:	MORPHOLOGICAL_RadiusSphereNorm_MaxIntensityCoor_RoiCentroidCoor_Dist
NHOCpeak:	MORPHOLOGICAL_RadiusSphereNorm_PeakIntensityCoor_RoiCentroidCoor_Dist
NHOPmax:	MORPHOLOGICAL_RadiusSphereNorm_MaxIntensityCoor_PerimeterCoor_3DSmallestDist
NHOPpeak:	MORPHOLOGICAL_RadiusSphereNorm_PeakIntensityCoor_PerimeterCoor_3DSmallestDist



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Features opened to the public

Narinée Hovhannisyane-Baghdasarian

MORPHOLOGICAL_* Features:

MaxIntensityCoor_RoiCentroidCoor_Dist
RadiusSphereNorm_MaxIntensityCoor_RoiCentroidCoor_Dist (**NHOCmax**)
RadiusRoiNorm_MaxIntensityCoor_RoiCentroidCoor_Dist
PeakIntensityCoor_RoiCentroidCoor_Dist
RadiusSphereNorm_PeakIntensityCoor_RoiCentroidCoor_Dist (**NHOCpeak**)
RadiusRoiNorm_PeakIntensityCoor_RoiCentroidCoor_Dist
RadiusSphereNorm_CentroidCoor_WcentroidCoor_Dist
RadiusRoiNorm_CentroidCoor_WcentroidCoor_Dist
MaxIntensityCoor_PerimeterCoor_3DSmallestDist
RadiusSphereNorm_MaxIntensityCoor_PerimeterCoor_3DSmallestDist (**NHOPmax**)
RadiusRoiNorm_MaxIntensityCoor_PerimeterCoor_3DSmallestDist
MaxIntensityCoor_PerimeterCoor_2DAxialSmallestDist
RadiusSphereNorm_MaxIntensityCoor_PerimeterCoor_2DAxialSmallestDist
RadiusRoiNorm_MaxIntensityCoor_PerimeterCoor_2DAxialSmallestDist
MaxIntensityCoor_PerimeterCoor_2DCoronalSmallestDist
RadiusSphereNorm_MaxIntensityCoor_PerimeterCoor_2DCoronalSmallestDist
RadiusRoiNorm_MaxIntensityCoor_PerimeterCoor_2DCoronalSmallestDist
MaxIntensityCoor_PerimeterCoor_2DSagittalSmallestDist
RadiusSphereNorm_MaxIntensityCoor_PerimeterCoor_2DSagittalSmallestDist
RadiusRoiNorm_MaxIntensityCoor_PerimeterCoor_2DSagittalSmallestDist
PeakIntensityCoor_PerimeterCoor_3DSmallestDist
RadiusSphereNorm_PeakIntensityCoor_PerimeterCoor_3DSmallestDist (NHOPpeak)
RadiusRoiNorm_PeakIntensityCoor_PerimeterCoor_3DSmallestDist
PeakIntensityCoor_PerimeterCoor_2DAxialSmallestDist
RadiusSphereNorm_PeakIntensityCoor_PerimeterCoor_2DAxialSmallestDist
RadiusRoiNorm_PeakIntensityCoor_PerimeterCoor_2DAxialSmallestDist
PeakIntensityCoor_PerimeterCoor_2DCoronalSmallestDist
RadiusSphereNorm_PeakIntensityCoor_PerimeterCoor_2DCoronalSmallestDist
RadiusRoiNorm_PeakIntensityCoor_PerimeterCoor_2DCoronalSmallestDist
PeakIntensityCoor_PerimeterCoor_2DSagittalSmallestDist
RadiusSphereNorm_PeakIntensityCoor_PerimeterCoor_2DSagittalSmallestDist
RadiusRoiNorm_PeakIntensityCoor_PerimeterCoor_2DSagittalSmallestDist

See [LIFEx-features](#) for a fuller explanation of features



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Interface screenshot

Christophe Nioche

Main:

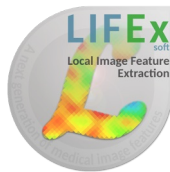
- added: export Dicom header as a CSV file

[DY_CTAC] Dynamic Brain MI/Dynamic_Brain_LZA: 2014_12_12_16_5CCB9911_5175FE82_75EA8D43

Acquisition t: z:

CSV

Tag hex	Tag name	VR	Value	Length	Field
(0008,0005)	Specific Character Set	CS	[ISO_IR 100]	#10	Specific Character Set
(0008,0008)	Image Type	CS	[ORIGINAL PRIMARY]	#28	Image Type
(0008,0012)	Instance Creation Date	DA	[2014-12-12]	#10	Instance Creation Date
(0008,0013)	Instance Creation Time	TM	[16:00:14]	#8	Instance Creation Time
(0008,0016)	SOP Class UID	UI	[1.2.840.10008.5.1.4.1.1.128]	#28	SOP Class UID
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(0008,0020)	Study Date	DA	[2014-12-12]	#10	Study Date
(0008,0021)	Series Date	DA	[2014-12-12]	#10	Series Date
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(0008,0023)	Content Date	DA	[2014-12-12]	#10	Content Date
(0008,002A)	Acquisition DateTime	DT	[2014-12-12T15:59:25]	#20	Acquisition DateTime
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(0008,0060)	Modality	CS	[PT]	#2	Modality
(0008,0070)	Manufacturer	LO	[Philips Medical Systems]	#24	Manufacturer
(0008,0080)	Institution Name	LO	[]	#24	Institution Name
(0008,0090)	Referring Physician's Name	PN	(no value available)	#0	Referring Physician's Name
(0008,1010)	Station Name	SH	(no value available)	#0	Station Name
(0008,1030)	Study Description	LO	[F-AV-1451 BETA]	#14	Study Description
(0008,103E)	Series Description	LO	[[DY_CTAC] Dynamic Brain]	#24	Series Description
(0008,1090)	Manufacturer's Model Name	LO	[GEMINI TF TOF 16]	#16	Manufacturer's Model Name
(0008,1110)	Referenced Study Sequence	SQ	(no value available)	#0	Referenced Study Sequence
(0008,1111)	Referenced Performed Procedure Step Sequence	SQ	(SequenceDelimitationItem)	#122	Referenced Performed Procedure Step Sequence



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LIFEx is still evolving

Christophe Nioche

Other functionalities are being added every week.
Stay tuned !
We hope you go on enjoying LIFEx



Awards

2018

The Best of
THE AACR JOURNALS

A COLLECTION OF THE MOST CITED RESEARCH ARTICLES

2020



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Please help us to keep it free by always quoting the LIFEx reference: (see below)

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LIFEx: a freeware for radiomic feature calculation in multimodality imaging to accelerate advances in the characterization of tumor heterogeneity. Cancer Research 2018; 78(16):4786-4789