

72% COMPLETO		24/7/2025	TÓPICOS INTERIORES (https://iaexpert.academy/topic/rastreamento-de-objetos-x-deteccao-de-objetos)	COMPARATIVO ENTRE ALGORITMOS DE RASTREAMENTO IMPLEMENTADOS NO OPENCV	DESAFIOS E PROJETOS (https://iaexpert.academy/challenges-and-projects)	ALGORITMOS DE RASTREAMENTO DE OBJETOS (https://iaexpert.academy/topic/algoritmos-de-rastreamento-de-objetos)	IN
<div>(https://iaexpert.academy) Rastreamento de Objetos com Python e OpenCV (https://iaexpert.academy/courses/rastreamento-objetos-python-opencv/)</div> <div>✓ Introdução (https://iaexpert.academy/lessons/introducao-36/)</div> <div>↳ 2 TÓPICOS</div> <div>✓ Rastreamento de objetos (https://iaexpert.academy/lessons/rastreamento-de-objetos/)</div> <div>↳ 29 TÓPICOS</div> <div>✓ Rastreamento (https://iaexpert.academy/de-objetos-x-/topic/rastreamento-de-objetos-x-deteccao-de-objetos-objetos/)</div> <div>✓ Algoritmos de rastreamento /topic/algoritmos-de-objetos - rastreamento-de-complementarcomplementar/)</div> <div>✓ Algoritmos (https://iaexpert.academy/BOOSTING/topic/algoritmos-e-mil-boosting-e-mil/)</div> <div>✓ Algoritmos (https://iaexpert.academy/KCF e /topic/algoritmos-kcf-csrt-e-csrt/)</div> <div>✓ Algoritmos (https://iaexpert.academy/MedianFlow,/topic/algoritmos-TLD, MOSSE medianflow-tld-mosse-e Goturn e-goturn/)</div> <div>✓ Instalação (https://iaexpert.academy/das /topic/instalacao-das-ferramentasferramentas-12/)</div> <div>✓ Rastreamento (https://iaexpert.academy/de um objeto /topic/rastreamento-de-um-objeto-1/)</div> <div>✓ Rastreamento (https://iaexpert.academy/de um objeto /topic/rastreamento-de-um-objeto-2/)</div> <div>✓ Rastreamento (https://iaexpert.academy/de um objeto /topic/rastreamento-de-um-objeto-3/)</div> <div>✓ Rastreamento (https://iaexpert.academy/de um objeto /topic/rastreamento-de-um-objeto-4/)</div> <div>✓ Rastreamento (https://iaexpert.academy/de mais /topic/rastreamento-de-objetos 1 mais-objetos-1/)</div> <div>✓ Rastreamento (https://iaexpert.academy/de mais /topic/rastreamento-de-objetos 2 mais-objetos-2/)</div> <div>✓ Rastreamento (https://iaexpert.academy/de mais /topic/rastreamento-de-objetos 3 mais-objetos-3/)</div> <div>✓ Rastreamento (https://iaexpert.academy/com Goturn /topic/rastreamento-cor-goturn/)</div> <div>✓ Detecção (https://iaexpert.academy/de /topic/deteccao-de-objetos-objetos/)</div> <div>✓ Detecção de (https://iaexpert.academ-objetos + /topic/deteccao-de-rastreamentoobjetos-rastreamento-1/1)</div> <div>✓ Detecção de (https://iaexpert.academ-objetos + /topic/deteccao-de-</div>		Olá!	Nas aulas teóricas sobre os algoritmos a seguir, é mostrada somente uma intuição sobre cada um. Abaixo deixamos material adicional caso você queira aprofundar os estudos 😊	<div>• BOOSTING<ul style="list-style-type: none">cv::TrackerBoosting Class Reference: https://docs.opencv.org/3.4/d1/d1a/classcv_1_1TrackerBoosting.html (https://docs.opencv.org/3.4/d1/d1a/classcv_1_1TrackerBoosting.html)Real-Time Tracking via On-line Boosting: http://www.bmva.org/bmvc/2006/papers/033.pdf (http://www.bmva.org/bmvc/2006/papers/033.pdf)</div> <div>• MIL<ul style="list-style-type: none">cv::TrackerMIL Class Reference: https://docs.opencv.org/3.4/d0/d26/classcv_1_1TrackerMIL.html (https://docs.opencv.org/3.4/d0/d26/classcv_1_1TrackerMIL.html)Visual tracking with online multiple instance learning: https://vision.cornell.edu/se3/wp-content/uploads/2014/09/0fcfd5086e4e9dd86c000000.pdf (https://vision.cornell.edu/se3/wp-content/uploads/2014/09/0fcfd5086e4e9dd86c000000.pdf)</div> <div>• KCF<ul style="list-style-type: none">cv::TrackerKCF Class Reference: https://docs.opencv.org/3.4/d2/dff/classcv_1_1TrackerKCF.html (https://docs.opencv.org/3.4/d2/dff/classcv_1_1TrackerKCF.html)Geometric affine transformation estimation via correlation filter for visual tracking: https://www.sciencedirect.com/science/article/abs/pii/S0925231216305422 (https://www.sciencedirect.com/science/article/abs/pii/S0925231216305422)EnKCF: Ensemble of Kernelized Correlation Filters for High-Speed Object Tracking:https://www.groundai.com/project/enkcf-ensemble-of-kernelized-correlation-filters-for-high-speed-object-tracking/1 (https://www.groundai.com/project/enkcf-ensemble-of-kernelized-correlation-filters-for-high-speed-object-tracking/1)High-Speed Tracking with Kernelized Correlation Filters: https://arxiv.org/pdf/1404.7584.pdf (https://arxiv.org/pdf/1404.7584.pdf)</div> <div>• CSRT<ul style="list-style-type: none">cv::TrackerCSRT Class Reference: https://docs.opencv.org/3.4/d2/da2/classcv_1_1TrackerCSRT.html (https://docs.opencv.org/3.4/d2/da2/classcv_1_1TrackerCSRT.html)Discriminative Correlation Filter with Channel and Spatial Reliability: https://arxiv.org/pdf/1611.08461.pdf (https://arxiv.org/pdf/1611.08461.pdf)Faster RCNN Detection Based OpenCV CSRT Tracker Using Drone Data:https://www.researchgate.net/publication/33955637_Faster_RCNN_Detection_Based_OpenCV_CSRT_Tracker_Using_Drone_Data (https://www.researchgate.net/publication/33955637_Faster_RCNN_Detection_Based_OpenCV_CSRT_Tracker_Using_Drone_Data)</div> <div>• MEDIANFLOW<ul style="list-style-type: none">cv::TrackerMedianFlow Class Reference: https://docs.opencv.org/3.4/d7/d86/classcv_1_1TrackerMedianFlow.html (https://docs.opencv.org/3.4/d7/d86/classcv_1_1TrackerMedianFlow.html)Evaluation of Visual Tracking Algorithms for Embedded Devices:https://www.researchgate.net/publication/317803149_Evaluation_of_Visual_Tracking_Algorithms_for_Embedded_Devices (https://www.researchgate.net/publication/317803149_Evaluation_of_Visual_Tracking_Algorithms_for_Embedded_Devices)Forward-Backward Error: Automatic Detection of Tracking Failures:http://kahlan.eps.surrey.ac.uk/featurespace/tld/Publications/2010_icpr.pdf (http://kahlan.eps.surrey.ac.uk/featurespace/tld/Publications/2010_icpr.pdf)</div> <div>• TLD<ul style="list-style-type: none">cv::TrackerTLD Class Reference: https://docs.opencv.org/3.4/dc/d1c/classcv_1_1TrackerTLD.html (https://docs.opencv.org/3.4/dc/d1c/classcv_1_1TrackerTLD.html)Tracking-Learning-Detection: http://vision.stanford.edu/teaching/cs231b_spring1415/papers/Kalal-PAMI.pdf (http://vision.stanford.edu/teaching/cs231b_spring1415/papers/Kalal-PAMI.pdf)Real-Time Pedestrian Tracking and Counting with TLD:https://www.researchgate.net/publication/328608910_Real-Time_Pedestrian_Tracking_and_Counting_with_TLD (https://www.researchgate.net/publication/328608910_Real-Time_Pedestrian_Tracking_and_Counting_with_TLD)An improved TLD target tracking algorithm based on the variable-scale, compressing tracking:https://www.researchgate.net/publication/322001178_An_improved_TLD_target_tracking_algorithm_based_on_the_variable-scale_compressing_tracking (https://www.researchgate.net/publication/322001178_An_improved_TLD_target_tracking_algorithm_based_on_the_variable-scale_compressing_tracking)</div> <div>• MOSSE<ul style="list-style-type: none">cv::TrackerMOSSE Class Reference: https://docs.opencv.org/3.4/d0/d02/classcv_1_1TrackerMOSSE.html (https://docs.opencv.org/3.4/d0/d02/classcv_1_1TrackerMOSSE.html)Visual Object Tracking using Adaptive Correlation Filters:https://www.cs.colostate.edu/~draper/papers/bolme_cvpr10.pdf (https://www.cs.colostate.edu/~draper/papers/bolme_cvpr10.pdf)</div> <div>• GOTURN<ul style="list-style-type: none">cv::TrackerGOTURN Class Reference: https://docs.opencv.org/3.4/d7/d4c/classcv_1_1TrackerGOTURN.html (https://docs.opencv.org/3.4/d7/d4c/classcv_1_1TrackerGOTURN.html)GOTURN : Deep Learning based Object Tracking: https://www.learnopencv.com/goturn-deep-learning-based-object-tracking/ (https://www.learnopencv.com/goturn-deep-learning-based-object-tracking/)Learning to Track at 100 FPS with Deep Regression Networks:http://davheld.github.io/GOTURN/GOTURN.pdf (http://davheld.github.io/GOTURN/GOTURN.pdf)VOT 2014 dataset: https://www.votchallenge.net/vot2014/dataset.html (https://www.votchallenge.net/vot2014/dataset.html)</div> <div>• COMPARATIVO ENTRE ALGORITMOS DE RASTREAMENTO IMPLEMENTADOS NO OPENCV<ul style="list-style-type: none">Comparison of tracking algorithms implemented in OpenCV: https://www.matec-conferences.org/articles/mateconf/pdf/2016/39/mateconf_csc2016_04031.pdf (https://www.matec-conferences.org/articles/mateconf/pdf/2016/39/mateconf_csc2016_04031.pdf)Comparing state of the art Region of Interest trackers: https://medium.com/teleidoscope/comparing-state-of-the-art-</div>			

region-of-interest-trackers-906ba420e80d (<https://medium.com/weleidoscope/comparing-state-of-the-art-region-of-interest-trackers-906ba420e80d>)
trackers-906ba420e80d

Rastreamento de Objetos com Python e OpenCV

(<https://iaexpert.academy/courses/rastreamento-objetos-python-opencv/>)

- Introdução (<https://iaexpert.academy/lessons/introducao-36/>)
- 2 TÓPICOS
- Rastreamento de objetos (<https://iaexpert.academy/lessons/rastreamento-de-objetos/>)
- Algoritmos de rastreamento /topic/algoritmos-de-objetos-complementarcomplementar/)
- Algoritmos BOOSTING /topic/algoritmos-e MIL boosting-e-mil/)
- Algoritmos KCF e CSRT /topic/algoritmos-kcf-csrt/)
- Algoritmos MedianFlow, TLD, MOSSE medianflow-tld-mosse-e Goturn e goturn/)
- Instalação das ferramentas /topic/instalacao-das-ferramentasferramentas-12/)
- Rastreamento de um objeto /topic/rastreamento-de-um-objeto-1/)
- Rastreamento de um objeto /topic/rastreamento-de-um-objeto-2/)
- Rastreamento de um objeto /topic/rastreamento-de-um-objeto-3/)
- Rastreamento de um objeto /topic/rastreamento-de-um-objeto-4/)
- Rastreamento de mais objetos 1 /topic/rastreamento-de-objetos-1/mais-objetos-1/)
- Rastreamento de mais objetos 2 /topic/rastreamento-de-objetos-2/mais-objetos-2/)
- Rastreamento de mais objetos 3 /topic/rastreamento-de-objetos-3/mais-objetos-3/)
- Rastreamento com Goturn /topic/rastreamento-cor-goturn/)
- Deteccão de objetos /topic/deteccao-de-objetos/objetos/)
- Deteccão de objetos + rastreamento /topic/deteccao-de-rastreamento-objetos-rastreamento-1/objetos-1/)
- Deteccão de objetos + rastreamento /topic/deteccao-de-rastreamento-objetos-rastreamento-2/objetos-2/)

Object Tracking using OpenCV (C++/Python): <https://www.learnopencv.com/object-tracking-using-opencv-cpp-python/> (<https://www.learnopencv.com/object-tracking-using-opencv-cpp-python/>)

• MEANSHIFT e CAMSHIFT

- Meanshift and Camshift: https://docs.opencv.org/3.4/d7/d00/tutorial_meanshift.html (https://docs.opencv.org/3.4/d7/d00/tutorial_meanshift.html)
- Meanshift and Camshift: https://opencv-python-tutroals.readthedocs.io/en/latest/py_tutorials/py_video/py_meanshift/py_meanshift.html (https://opencv-python-tutroals.readthedocs.io/en/latest/py_tutorials/py_video/py_meanshift/py_meanshift.html)
- MEANSHIFT TRACKING:https://www.bogotobogo.com/python/OpenCV_Python/python_opencv3_mean_shift_tracking_segmentation.php (https://www.bogotobogo.com/python/OpenCV_Python/python_opencv3_mean_shift_tracking_segmentation.php)
- Mean Shift: A Robust Approach Toward Feature Space Analysis:<https://courses.csail.mit.edu/6.869/handouts/PAMIMeanShift.pdf> (<https://courses.csail.mit.edu/6.869/handouts/PAMIMeanShift.pdf>)
- Track objects with Camshift using OpenCV: <https://www.geeksforgeeks.org/track-objects-with-camshift-using-opencv/> (<https://www.geeksforgeeks.org/track-objects-with-camshift-using-opencv/>)
- Learning OpenCV 3 Computer Vision with Python - Second Edition:https://subscription.packtpub.com/book/application_development/9781785283840 (https://subscription.packtpub.com/book/application_development/9781785283840)
- Object Tracking Using Improved CAMShift Algorithm Combined with Motion Segmentation:https://www.researchgate.net/publication/261194641_Object_Tracking_Using_Improved_CAMShift_Algorithm_Combined_with_Motion_Segmentation (https://www.researchgate.net/publication/261194641_Object_Tracking_Using_Improved_CAMShift_Algorithm_Combined_with_Motion_Segmentation)
- Computer Vision Face Tracking for Use in Perceptual User Interface: http://opencv.jp/opencv-1.0.0_org/docs/papers/camshift.pdf (http://opencv.jp/opencv-1.0.0_org/docs/papers/camshift.pdf)

• FLUXO ÓPTICO ESPARSO E FLUXO ÓPTICO DENSO

- Evaluation Datasets: <http://vision.middlebury.edu/flow/data/> (<http://vision.middlebury.edu/flow/data/>)
- Taylor Series as Approximations: http://www.norsemathology.org/wiki/index.php?title=Taylor_Series_as_Approximations (http://www.norsemathology.org/wiki/index.php?title=Taylor_Series_as_Approximations)
- Introduction to Motion Estimation with Optical Flow: <https://nanonets.com/blog/optical-flow/#opticalflow> (<https://nanonets.com/blog/optical-flow/#opticalflow>)
- Optical Flow: https://docs.opencv.org/3.4/d4/dee/tutorial_optical_flow.html (https://docs.opencv.org/3.4/d4/dee/tutorial_optical_flow.html)
- Optical flow: https://en.wikipedia.org/wiki/Optical_flow (https://en.wikipedia.org/wiki/Optical_flow)
- A COMBINED CORNER AND EDGE DETECTOR: <http://www.bmva.org/bmvc/1988/avc-88-023.pdf> (<http://www.bmva.org/bmvc/1988/avc-88-023.pdf>)
- Harris Corner Detector-An Overview of the Original Paper: <https://medium.com/swlh/harris-corner-detector-an-overview-of-the-original-paper-cf20c502ab0f> (<https://medium.com/swlh/harris-corner-detector-an-overview-of-the-original-paper-cf20c502ab0f>)
- Notes on the Harris Detector:<https://courses.cs.washington.edu/courses/cse576/06sp/notes/HarrisDetector.pdf> (<https://courses.cs.washington.edu/courses/cse576/06sp/notes/HarrisDetector.pdf>)
- Optical Flow Measurement using Lucas kanade Method:<https://research.ijscaonline.org/volume61/number10/pxc3884611.pdf> (<https://research.ijscaonline.org/volume61/number10/pxc3884611.pdf>)
- Lucas-Kanade method: https://en.wikipedia.org/wiki/Lucas%E2%80%93Kanade_method (https://en.wikipedia.org/wiki/Lucas%E2%80%93Kanade_method)
- Good features to track: <http://www.ai.mit.edu/courses/6.891/handouts/shi94good.pdf> (<http://www.ai.mit.edu/courses/6.891/handouts/shi94good.pdf>)
- Feature Detection: https://docs.opencv.org/3.0-beta/modules/imgproc/doc/feature_detection.html#goodfeaturesofmotion (https://docs.opencv.org/3.0-beta/modules/imgproc/doc/feature_detection.html#goodfeaturesofmotion)
- Two-Frame Motion Estimation Based on Polynomial Expansion: <http://www.diva-portal.org/smash/get/diva2:273847/FULLTEXT01.pdf> (<http://www.diva-portal.org/smash/get/diva2:273847/FULLTEXT01.pdf>)
- Video Segmentation via Object Flow: <http://files.is.tue.mpg.de/black/papers/TsaiCVPR2016.pdf> (<http://files.is.tue.mpg.de/black/papers/TsaiCVPR2016.pdf>)