**PCL API模块划分**

1. **简述**

总计51个PCL API算子，由class与function两部分组成，分布于Features与Octree模块之中。

其中属于Features模块的API总计39个（33个class，6个function），属于Octree模块的API总计12个（12个class）

1. **模块及对应的API**

**Features:**

1. [pcl::ShapeContext3DEstimation< PointInT, PointNT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_shape_context3_d_estimation.html)
2. [pcl::BOARDLocalReferenceFrameEstimation< PointInT, PointNT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_b_o_a_r_d_local_reference_frame_estimation.html)
3. [pcl::BoundaryEstimation< PointInT, PointNT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_boundary_estimation.html)
4. [pcl::BRISK2DEstimation< PointInT, PointOutT, KeypointT, IntensityT >](https://pointclouds.org/documentation/classpcl_1_1_b_r_i_s_k2_d_estimation.html)
5. [pcl::CRHEstimation< PointInT, PointNT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_c_r_h_estimation.html)
6. [pcl::CVFHEstimation< PointInT, PointNT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_c_v_f_h_estimation.html)
7. [pcl::DifferenceOfNormalsEstimation< PointInT, PointNT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_difference_of_normals_estimation.html)
8. [pcl::ESFEstimation< PointInT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_e_s_f_estimation.html)
9. [pcl::Feature< PointInT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_feature.html)
10. [pcl::FeatureWithLocalReferenceFrames< PointInT, PointRFT >](https://pointclouds.org/documentation/classpcl_1_1_feature_with_local_reference_frames.html)
11. [pcl::FLARELocalReferenceFrameEstimation< PointInT, PointNT, PointOutT, SignedDistanceT >](https://pointclouds.org/documentation/classpcl_1_1_f_l_a_r_e_local_reference_frame_estimation.html)
12. [pcl::FPFHEstimation< PointInT, PointNT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_f_p_f_h_estimation.html)
13. [pcl::GASDEstimation< PointInT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_g_a_s_d_estimation.html)
14. [pcl::GASDColorEstimation< PointInT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_g_a_s_d_color_estimation.html)
15. [pcl::GFPFHEstimation< PointInT, PointLT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_g_f_p_f_h_estimation.html)
16. [pcl::GRSDEstimation< PointInT, PointNT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_g_r_s_d_estimation.html)
17. [pcl::IntensityGradientEstimation< PointInT, PointNT, PointOutT, IntensitySelectorT >](https://pointclouds.org/documentation/classpcl_1_1_intensity_gradient_estimation.html)
18. [pcl::IntensitySpinEstimation< PointInT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_intensity_spin_estimation.html)
19. [pcl::MomentInvariantsEstimation< PointInT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_moment_invariants_estimation.html)
20. [pcl::Narf](https://pointclouds.org/documentation/classpcl_1_1_narf.html)
21. [pcl::NormalEstimation< PointInT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_normal_estimation.html)
22. [pcl::OURCVFHEstimation< PointInT, PointNT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_o_u_r_c_v_f_h_estimation.html)
23. [pcl::PFHEstimation< PointInT, PointNT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_p_f_h_estimation.html)
24. [pcl::PrincipalCurvaturesEstimation< PointInT, PointNT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_principal_curvatures_estimation.html)
25. [pcl::RangeImageBorderExtractor](https://pointclouds.org/documentation/classpcl_1_1_range_image_border_extractor.html)
26. [pcl::RIFTEstimation< PointInT, GradientT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_r_i_f_t_estimation.html)
27. [pcl::RSDEstimation< PointInT, PointNT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_r_s_d_estimation.html)
28. [pcl::SHOTEstimation< PointInT, PointNT, PointOutT, PointRFT >](https://pointclouds.org/documentation/classpcl_1_1_s_h_o_t_estimation.html)
29. [pcl::SHOTColorEstimation< PointInT, PointNT, PointOutT, PointRFT >](https://pointclouds.org/documentation/classpcl_1_1_s_h_o_t_color_estimation.html)
30. [pcl::SHOTLocalReferenceFrameEstimation< PointInT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_s_h_o_t_local_reference_frame_estimation.html)
31. [pcl::SpinImageEstimation< PointInT, PointNT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_spin_image_estimation.html)
32. [pcl::UniqueShapeContext< PointInT, PointOutT, PointRFT >](https://pointclouds.org/documentation/classpcl_1_1_unique_shape_context.html)
33. [pcl::VFHEstimation< PointInT, PointNT, PointOutT >](https://pointclouds.org/documentation/classpcl_1_1_v_f_h_estimation.html)
34. bool pcl::computePointNormal (const pcl::PointCloud<PointT> &cloud, Eigen::Vector4f &plane\_parameters, float &curvature)
35. void pcl::flipNormalTowardsViewpoint(const PointT &point, float vp\_x, float vp\_y, float vp\_z, Eigen::Matrix<Scalar, 4, 1> &normal)
36. bool pcl::flipNormalTowardsNormalsMean (pcl::PointCloud<PointNT> const &normal\_cloud, pcl::Indices const &normal\_indices, Eigen::Vector3f &normal)
37. [PCL\_EXPORTS](https://pointclouds.org/documentation/pcl__macros_8h.html" \l "a2b443b7908f11aed38b620b570e5ebce) bool [pcl::computePairFeatures](https://pointclouds.org/documentation/group__features.html" \l "gaacfebe0c36e7d879e48bd3f163aec3c9) (const Eigen::Vector4f &p1, const Eigen::Vector4f &n1, const Eigen::Vector4f &p2, const Eigen::Vector4f &n2, float &f1, float &f2, float &f3, float &f4)
38. void [pcl::getFeaturePointCloud](https://pointclouds.org/documentation/group__features.html" \l "gaa0c7f523d0882cc9e9a4273b0276d4ab) (const std::vector< Eigen::MatrixXf, Eigen::aligned\_allocator< Eigen::MatrixXf > > &histograms2D, [PointCloud](https://pointclouds.org/documentation/classpcl_1_1_point_cloud.html)< [Histogram](https://pointclouds.org/documentation/structpcl_1_1_histogram.html)< N > > &histogramsPC)
39. Eigen::MatrixXf [pcl::computeRSD](https://pointclouds.org/documentation/group__features.html" \l "gaa1d42d8d792cf835ece2ee2a7cf7180a) (const [pcl::PointCloud](https://pointclouds.org/documentation/classpcl_1_1_point_cloud.html)< PointInT > &surface, const [pcl::PointCloud](https://pointclouds.org/documentation/classpcl_1_1_point_cloud.html)< PointNT > &normals, const [pcl::Indices](https://pointclouds.org/documentation/namespacepcl.html" \l "a8bfe09b8680e7129dd0fd6177c1a2ce6) &indices, double max\_dist, int nr\_subdiv, double plane\_radius, PointOutT &radii, bool compute\_histogram=false)

**Octree:**

1. [pcl::octree::OctreePointCloud< PointT, LeafContainerT, BranchContainerT, OctreeT >](https://pointclouds.org/documentation/classpcl_1_1octree_1_1_octree_point_cloud.html)
2. [pcl::octree::OctreePointCloudAdjacency< PointT, LeafContainerT, BranchContainerT >](https://pointclouds.org/documentation/classpcl_1_1octree_1_1_octree_point_cloud_adjacency.html)
3. [pcl::octree::OctreePointCloudChangeDetector< PointT, LeafContainerT, BranchContainerT >](https://pointclouds.org/documentation/classpcl_1_1octree_1_1_octree_point_cloud_change_detector.html)
4. [pcl::octree::OctreePointCloudDensity< PointT, LeafContainerT, BranchContainerT >](https://pointclouds.org/documentation/classpcl_1_1octree_1_1_octree_point_cloud_density.html)
5. [pcl::octree::OctreePointCloudOccupancy< PointT, LeafContainerT, BranchContainerT >](https://pointclouds.org/documentation/classpcl_1_1octree_1_1_octree_point_cloud_occupancy.html)
6. [pcl::octree::OctreePointCloudPointVector< PointT, LeafContainerT, BranchContainerT, OctreeT >](https://pointclouds.org/documentation/classpcl_1_1octree_1_1_octree_point_cloud_point_vector.html)
7. [pcl::octree::OctreePointCloudSinglePoint< PointT, LeafContainerT, BranchContainerT, OctreeT >](https://pointclouds.org/documentation/classpcl_1_1octree_1_1_octree_point_cloud_single_point.html)
8. [pcl::octree::OctreePointCloudVoxelCentroid< PointT, LeafContainerT, BranchContainerT >](https://pointclouds.org/documentation/classpcl_1_1octree_1_1_octree_point_cloud_voxel_centroid.html)
9. [pcl::octree::OctreePointCloudSearch< PointT, LeafContainerT, BranchContainerT >](https://pointclouds.org/documentation/classpcl_1_1octree_1_1_octree_point_cloud_search.html)
10. [pcl::octree::OctreeDepthFirstIterator< OctreeT >](https://pointclouds.org/documentation/classpcl_1_1octree_1_1_octree_depth_first_iterator.html)
11. [pcl::octree::OctreeBreadthFirstIterator< OctreeT >](https://pointclouds.org/documentation/classpcl_1_1octree_1_1_octree_breadth_first_iterator.html)
12. [pcl::octree::OctreeFixedDepthIterator< OctreeT >](https://pointclouds.org/documentation/classpcl_1_1octree_1_1_octree_fixed_depth_iterator.html)