

Lio-Sam algorithm compilation

1、 Install dependencies

ROS(ubuntu 18.04 melodic)

Ceres solver

GTSAM

ndt_omp

2、 Source code path

imuCalibEx:

```
src/imuCalibEx
```

Lio-Sam:

```
src/Lio_Sam
```

3、 compile

Here we take Jetson nano as an example. The installation environment is ubuntu 18.04 and the ROS version is melodic. ROS (ubuntu 18.04 melodic), Ceres solver, GTSAM and other dependencies have been installed by default.

compile

If it is the first time to compile, please enter the following command:

```
sudo mv /usr/include/flann/ext/lz4.h /usr/include/flann/ext/lz4.h.bak  
sudo mv /usr/include/flann/ext/lz4hc.h /usr/include/flann/ext/lz4.h.bak  
sudo ln -s /usr/include/lz4.h /usr/include/flann/ext/lz4.h  
sudo ln -s /usr/include/lz4hc.h /usr/include/flann/ext/lz4hc.h
```

Then enter Lio_Sam's workspace to compile

```
cd ~/lio_sam_ws  
  
catkin build
```

Compilation completed effect:

```

/usr/include/pcl-1.8/pcl/sample_consensus/model_types.h:99:3: note: declared here
In file included from /usr/include/pcl-1.8/pcl/sample_consensus/sac_model.h:52:0,
    from /usr/include/pcl-1.8/pcl/sample_consensus/sac.h:45,
    from /usr/include/pcl-1.8/pcl/sample_consensus/ransac.h:44,
    from /usr/include/pcl-1.8/pcl/registration/icp.h:45,
    from /home/yahboom/wlr_lio_sam_ws/src/Lio_Sam/src/LIO-SAM/include/utility.h:28,
    from /home/yahboom/wlr_lio_sam_ws/src/Lio_Sam/src/LIO-SAM/src/featureExtraction.cpp:1:
/usr/include/pcl-1.8/pcl/sample_consensus/model_types.h: In function 'void __static_initialization_and_destruction_0(int, int)':
/usr/include/pcl-1.8/pcl/sample_consensus/model_types.h:99:3: warning: 'pcl::SAC_SAMPLE_SIZE' is deprecated: This map is deprecated and is kept only to prevent breaking existi
ted member of the SampleConsensusModel class [-Wdeprecated-declarations]
    SAC_SAMPLE_SIZE (sample_size_pairs, sample_size_pairs + sizeof (sample_size_pairs) / sizeof (SampleSizeModel));
    ^~~~~~
/usr/include/pcl-1.8/pcl/sample_consensus/model_types.h:99:3: note: declared here
ed /home/yahboom/wlr_lio_sam_ws/build/lio_sam; catkin build --get-env lio_sam | catkin env -si /usr/bin/make --jobserver-fds=6,7 -j; cd -
-----
Finished <<< lio_sam [ 49.5 seconds ]
-----
Warnings <<< linkalibr:make /home/yahboom/wlr_lio_sam_ws/logs/linkalibr/build.make.000.log
In file included from /home/yahboom/wlr_lio_sam_ws/src/imuCalibEx/src/imu_lidar_calibration/linkalibr/src/ros_linkalibr_test.cpp:32:0:
/usr/include/pcl-1.8/pcl/visualization/cloud_viewer.h:202:14: warning: 'template<class> class std::auto_ptr' is deprecated [-Wdeprecated-declarations]
    std::auto_ptr<CloudViewer_impl> impl_;
    ^~~~~~
In file included from /usr/include/c++/7/bits/locale_conv.h:41:0,
    from /usr/include/c++/7/locale:43,
    from /usr/include/c++/7/ios:43,
    from /usr/include/boost/math/policies/error_handling.hpp:12,
    from /usr/include/boost/math/special_functions/round.hpp:14,
    from /opt/ros/melodic/include/ros/time.h:58,
    from /opt/ros/melodic/include/ros/ros.h:38,
    from /home/yahboom/wlr_lio_sam_ws/src/imuCalibEx/src/imu_lidar_calibration/linkalibr/src/ros_linkalibr_test.cpp:7:
/usr/include/c++/7/bits/unique_ptr.h:51:28: note: declared here
    template<typename> class auto_ptr;
    ^~~~~~
ed /home/yahboom/wlr_lio_sam_ws/build/linkalibr; catkin build --get-env linkalibr | catkin env -si /usr/bin/make --jobserver-fds=6,7 -j; cd -
-----
Finished <<< linkalibr [ 2 minutes and 32.2 seconds ]
-----
[build] Summary: All 5 packages succeeded!
[build] Ignored: None.
[build] Warnings: 4 packages succeeded with warnings.
[build] Abandoned: None.
[build] Failed: None.
[build] Runtime: 3 minutes and 10.0 seconds total.
[build] Note: Workspace packages have changed, please re-source setup files to use them.
yahboom@yahboom-desktop:~/wlr_lio_sam_ws$

```

What you need to pay attention to is that when compiling imuCalibEx, if you are using a Jetson nano class arm motherboard. You need to modify the src/imuCalibEx/src/imu_lidar_calibration/ndt_omp/CMakeLists.txt file, refer to the location shown in the example picture below

```
SET(CMAKE_CXX_FLAGS "${CMAKE_CXX_FLAGS}")
```

```
CMakeLists.txt (-/jlr_bu_sam_ws/src/imuCalibEx/src/imu_lidar_calibration/ndt_omp) - gedit
cmake_minimum_required(VERSION 3.10)
project(ndt_omp)

add_definitions(-std=c++14)
set(CMAKE_CXX_FLAGS "-std=c++14")

if (BUILD_WITH_MARCH_NATIVE)
  add_compile_options(-march=native)
else()
  #add_definitions(-msse -msse2 -msse3 -msse4 -msse4.1 -msse4.2)
  #set(CMAKE_CXX_FLAGS "-msse -msse2 -msse3 -msse4 -msse4.1 -msse4.2")
  SET(CMAKE_CXX_FLAGS "${CMAKE_CXX_FLAGS}")
endif()

# pcl 1.7 causes a segfault when it is built with debug mode
set(CMAKE_BUILD_TYPE "RELEASE")

#find_package(PCL 1.7 REQUIRED)
#include_directories(${PCL_INCLUDE_DIRS})
#link_directories(${PCL_LIBRARY_DIRS})
#add_definitions(${PCL_DEFINITIONS})

message(STATUS "PCL_INCLUDE_DIRS:" ${PCL_INCLUDE_DIRS})
message(STATUS "PCL_LIBRARY_DIRS:" ${PCL_LIBRARY_DIRS})
message(STATUS "PCL_DEFINITIONS:" ${PCL_DEFINITIONS})

find_package(OpenMP)
if (OPENMP_FOUND)
  set (CMAKE_C_FLAGS "${CMAKE_C_FLAGS} ${OpenMP_C_FLAGS}")
  set (CMAKE_CXX_FLAGS "${CMAKE_CXX_FLAGS} ${OpenMP_CXX_FLAGS}")
endif()
```

If compiled on an X86 host.
Please uncomment these two pieces of code
Add comments to the following line of code
For jetson nano system, remove the comments from this paragraph

You also need to modify the src/imuCalibEx/src/imu_lidar_calibration/linkalibr/CMakeLists.txt file as shown below.

```
set(LIB_TBB_DIR /usr/lib/aarch64-linux-gnu)
```

```
CMakeLists.txt
79 src/init/InertialInitializer.cpp
80 src/state/State.cpp
81 src/state/StateHelper.cpp
82 src/state/Propagator.cpp
83 src/update/UpdaterLidarOdometry.cpp
84 src/track/lidarOdometry.cpp
85 src/core/linkalibrManager.cpp
86 )
87 target_link_libraries(linkalibr_lib ${thirdparty_libraries})
88 target_include_directories(linkalibr_lib PUBLIC src)
89
90 #####
91 # Adding different executables
92 #####
93 add_executable(ros_test_node src/ros/linkalibr_test.cpp)
94 target_link_libraries(ros_test_node linkalibr_lib ${catkin_LIBRARIES})
95
96 add_executable(ros_calib_init src/ros_calib/init.cpp)
97 target_link_libraries(ros_calib_init linkalibr_lib ${catkin_LIBRARIES})
98
99 #set(LIB_TBB_DIR /usr/lib/x86_64-linux-gnu)
100 set(LIB_TBB_DIR /usr/lib/aarch64-linux-gnu)
101
102 add_library(libtbb SHARED IMPORTED)
103 set_target_properties(libtbb PROPERTIES IMPORTED_LOCATION ${LIB_TBB_DIR}/libtbb.so.2)
104
105 add_executable(ros_calib_init_optimizer src/ros_calib/init_optimizer.cpp)
106 target_link_libraries(ros_calib_init_optimizer
```

If it is an X86 host, you need to remove the comment symbols
And add comments to the following code.
For jetson nano system, remove the comments from this paragraph