Makefile_VS_CMake

最近想写一段关于 BA 的程序，要用到 G2O 库。之前看高博的 SLAM 十四讲都是用的 CMakeLists，自己当时也是用的 CMakeLists，但后来在公司实习一直用的 Makefile，感觉后者更好用一些，就想着用 Makefile 编译包含 G2O 的程序。

原来的 CMakeLists.txt 如下：

```
cmake_minimum_required( VERSION 2.8 )

project( directMethod )

set( CMAKE_BUILD_TYPE Release )

set( CMAKE_CXX_FLAGS "-std=c++11 -O3" )

list( APPEND CMAKE_MODULE_PATH ${PROJECT_SOURCE_DIR}/cmake_modules )

find_package( OpenCV )

include_directories( ${OpenCV_INCLUDE_DIRS} )

find_package( G2O )

include_directories( ${G2O_INCLUDE_DIRS} )

include_directories( "/usr/include/eigen3" )

set( G2O_LIBS    g2o_core g2o_types_sba g2o_solver_csparse g2o_stuff g2o_csparse_extension )

add_executable( direct_sparse direct_sparse.cpp )
```

target_link_libraries(direct_sparse ${OpenCV_LIBS} ${G2O_LIBS})

最终生效可以编译的 makefile 文件如下：

INCLUDES = $(shell pkg-config --cflags opencv)

INCLUDES_EIGEN3 = -I /usr/include/eigen3

INLCUDES_G2O = -I /usr/local/include/g2o

LIBDIRS = $(shell pkg-config --libs opencv)

G2O_LIBS = /usr/local/lib/libg2o_core.so /usr/local/lib/libg2o_types_sba.so \

      /usr/local/lib/libg2o_solver_csparse.so /usr/local/lib/libg2o_csparse_extension.so \

      /usr/local/lib/libg2o_stuff.so

all:Feature_Direct_VO

Feature_Direct_VO:Feature_Direct_VO.o

      g++ -std=c++11 -o Feature_Direct_VO Feature_Direct_VO.o $(G2O_LIBS) $(LIBDIRS)

Feature_Direct_VO.o:Feature_Direct_VO.cpp

      g++ -std=c++11 -c Feature_Direct_VO.cpp $(INCLUDES) $(INCLUDES_EIGEN3) $(INCLUDE_G2O)

clean:

      rm -f *.o Feature_Direct_VO

其实原理挺简单，当用到一个第三方软件函数时，既要包含头文件，也要包含库文件。

	CMakeLists.txt	makefile
opencv	库文件：${OpenCV_LIBS}，这个宏在系统中有定义	库文件：LIBDIRS = $(shell pkg-config --libs opencv)
	头文件：include_directories(${OpenCV_INCLUDE_DIRS})	头文件：INCLUDES = $(shell pkg-config --cflags opencv)
g2o	库文件：set(G2O_LIBS g2o_core g2o_types_sba g2o_solver_csparse g2o_stuff g2o_csparse_extension)	库文件：G2O_LIBS = /usr/local/lib/libg2o_core.so
	头文件：include_directories(${G2O_INCLUDE_DIRS})	头文件：INLCUDES_G2O = -I /usr/local/include/g2o
eigen3	头文件：include_directories("/usr/include/eigen3")	头文件：INCLUDES_EIGEN3 = -I /usr/include/eigen3

注意：

1. g2o 的库文件不止上面的一个，要根据具体需要进行 include，所有的库均在/usr/local/include/ 目录下；

2. eigen3 是一个纯用头文件搭起来的库，所以只需要包含头文件（高博的 SLAM 十四讲）