YDLIDAR SDK build unknown build passing codebeat C

Introduction

YDLIDAR(https://www.ydlidar.com/) series is a set of high-performance and low-cost LIDAR sensors, which is the perfect sensor of 2D SLAM, 3D reconstruction, multi-touch, and safety applications.

If you are using ROS (Robot Operating System), please use our open-source ROS Driver .

Release Notes

Title	Version	Data
SDK	1.3.8	2018-11-13

- [new feature] output scan frequency.
- [new feature] repair Device health exception.

Dataset

Support LIDAR Model(Only S4Pro support intensity)

Model	Baudrate	Sampling Frequency	Range(m)	Scanning Frequency(HZ)	Working temperature(°C)	Laser power max(mW)	voltage(V)	Current(mA)
G4	230400	9000	0.26-16	5-12	0-50	~5	4.8-5.2	400-480
X4	128000	5000	0.12-10	5-12	0-40	~5	4.8-5.2	330-380
F4	115200	4000	0.1-12	5-12	0-40	~5	4.8-5.2	400-480
S4	115200	4000	0.1-8	6-12	0-40	~5	4.8-5.2	330-380
S4Pro	153600	4000	0.1-8	6-12	0-40	~5	4.8-5.2	330-380

How to build YDLIDAR SDK samples

```
$ git clone https://github.com/yangfuyuan/ydlidar_sdk

$ cd ydlidar_sdk

$ git checkout master
```

Linux:

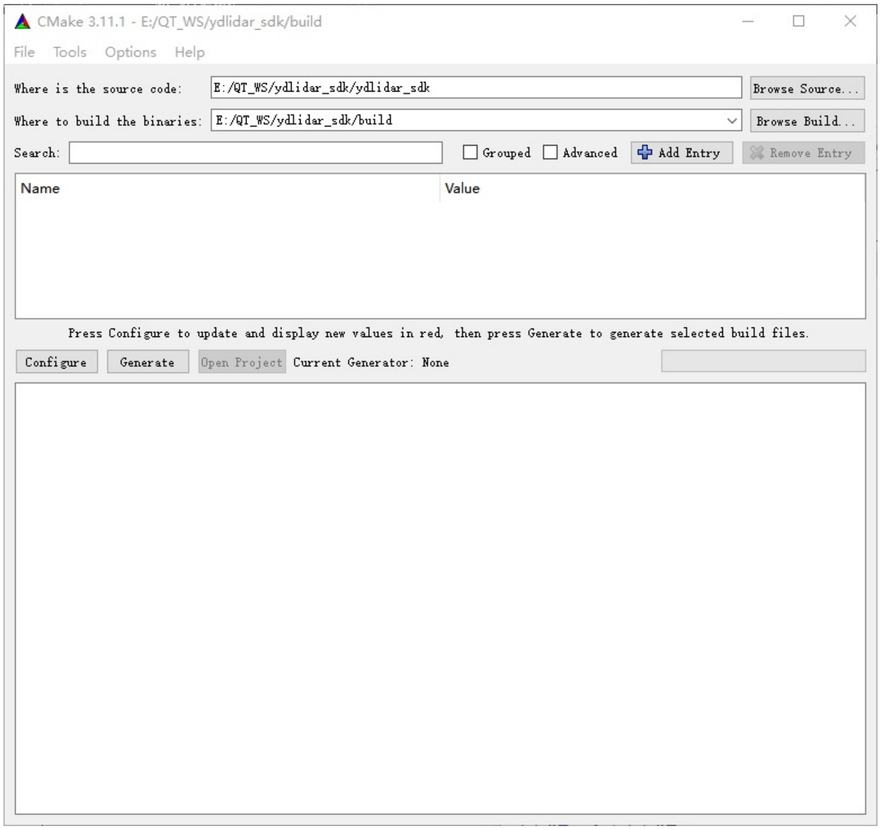
```
$ cd startup

$ chmod +x initenv.sh

$ sudo ./initenv.sh  ##change the serial port to be readable and writable

$ cd ../..

$ mkdir build

$ cd build

$ cmake ../ydlidar_sdk   ##windows: cmake -G "Visual Studio 14 2017 Win64" ../ydlidar_sdk

$ make
```

Windows:

i. install cmake(if there is no cmake)

ii. build steps:

Step1: open cmake-gui and select source code/binaries directory



CMake 3.11.1 - E:/QT_WS/ydlidar_sdk/build

Where is the source code: E:/QT_WS/ydlidar_sdk/ydlidar_sdk

Where to build the binaries: E:/QT_WS/ydlidar_sdk/build

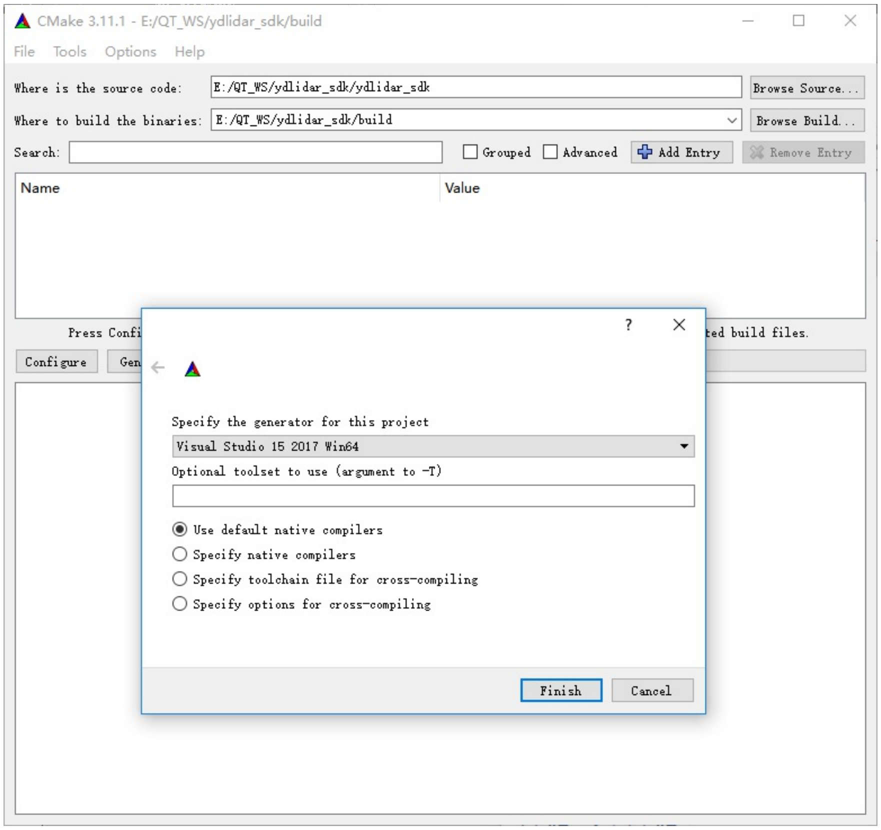
Search:

□ Grouped □ Advanced

Press Configure to update and display new values in red, then press Generate to generate selected build files.

Current Generator: None

Step2: Configure and select build toolchain(choose the VS version in your system)



Where is the source code: E:/QT_WS/ydlidar_sdk/ydlidar_sdk

Where to build the binaries: E:/QT_WS/ydlidar_sdk/build

Search:

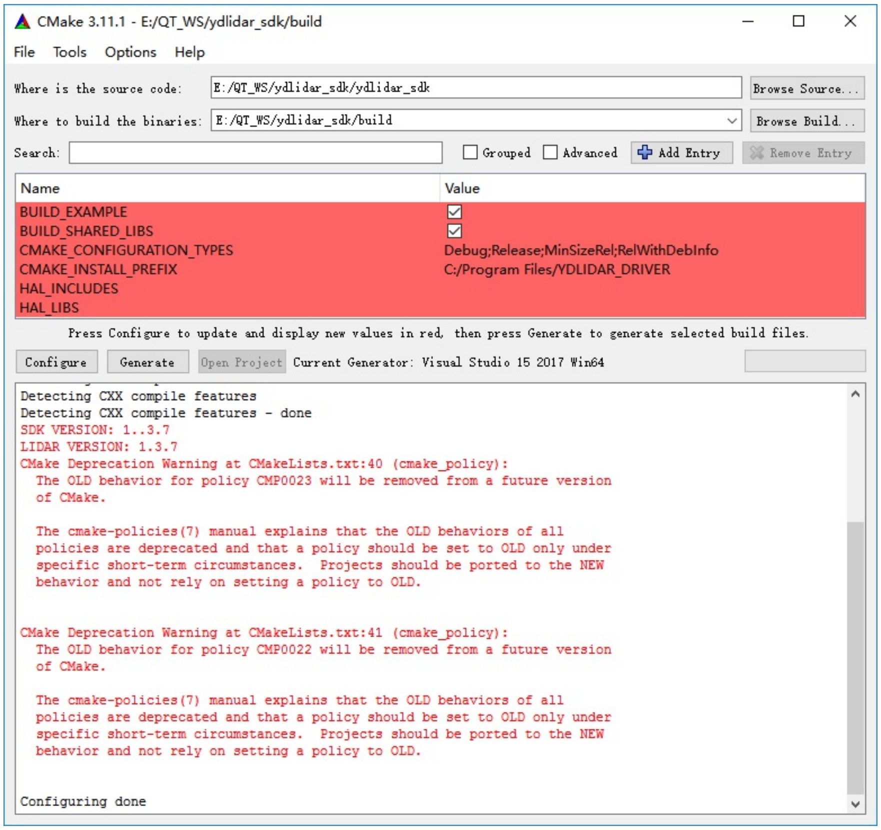
Specify the generator for this project

Visual Studio 15 2017 Win64

Optional toolset to use (argument to -T)

- ● Use default native compilers
- ○ Specify native compilers
- ○ Specify toolchain file for cross-compiling
- ○ Specify options for cross-compiling

Step3: configuring done(click “Configure” button)



Where is the source code: E:/QT_WS/ydlidar_sdk/ydlidar_sdk

Where to build the binaries: E:/QT_WS/ydlidar_sdk/build

Search:

Name	Value
BUILD_EXAMPLE	☑
BUILD_SHARED_LIBS	☑
CMAKE_CONFIGURATION_TYPES	Debug;Release;MinSizeRel;RelWithDebInfo
CMAKE_INSTALL_PREFIX	C:/Program Files/YDLIDAR_DRIVER
HAL_INCLUDES	
HAL_LIBS	

Press Configure to update and display new values in red, then press Generate to generate selected build files.

Current Generator: Visual Studio 15 2017 Win64

```
Detecting CXX compile features
Detecting CXX compile features - done
SDK VERSION: 1..3.7
LIDAR VERSION: 1.3.7
CMake Deprecation Warning at CMakeLists.txt:40 (cmake_policy):
  The OLD behavior for policy CMP0023 will be removed from a future version
  of CMake.

  The cmake-policies(7) manual explains that the OLD behaviors of all
  policies are deprecated and that a policy should be set to OLD only under
  specific short-term circumstances.  Projects should be ported to the NEW
  behavior and not rely on setting a policy to OLD.


CMake Deprecation Warning at CMakeLists.txt:41 (cmake_policy):
  The OLD behavior for policy CMP0022 will be removed from a future version
  of CMake.

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  policies are deprecated and that a policy should be set to OLD only under
  specific short-term circumstances.  Projects should be ported to the NEW
  behavior and not rely on setting a policy to OLD.


Configuring done
```
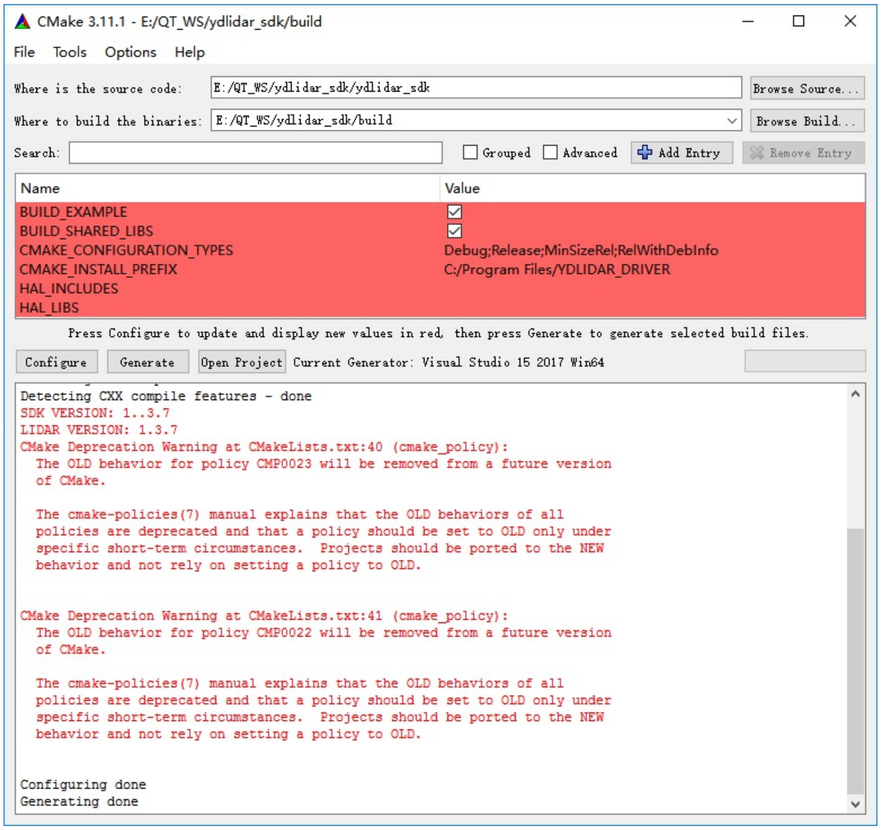

Step4: generating done(click “Generate” button)



CMake 3.11.1 - E:/QT_WS/ydlidar_sdk/build

Where is the source code: E:/QT_WS/ydlidar_sdk/ydlidar_sdk

Where to build the binaries: E:/QT_WS/ydlidar_sdk/build

Name	Value
BUILD_EXAMPLE	☑
BUILD_SHARED_LIBS	☑
CMAKE_CONFIGURATION_TYPES	Debug;Release;MinSizeRel;RelWithDebInfo
CMAKE_INSTALL_PREFIX	C:/Program Files/YDLIDAR_DRIVER
HAL_INCLUDES	
HAL_LIBS	

Press Configure to update and display new values in red, then press Generate to generate selected build files.

Current Generator: Visual Studio 15 2017 Win64

```
Detecting CXX compile features - done
SDK VERSION: 1..3.7
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  policies are deprecated and that a policy should be set to OLD only under
  specific short-term circumstances.  Projects should be ported to the NEW
  behavior and not rely on setting a policy to OLD.


Configuring done
Generating done
```
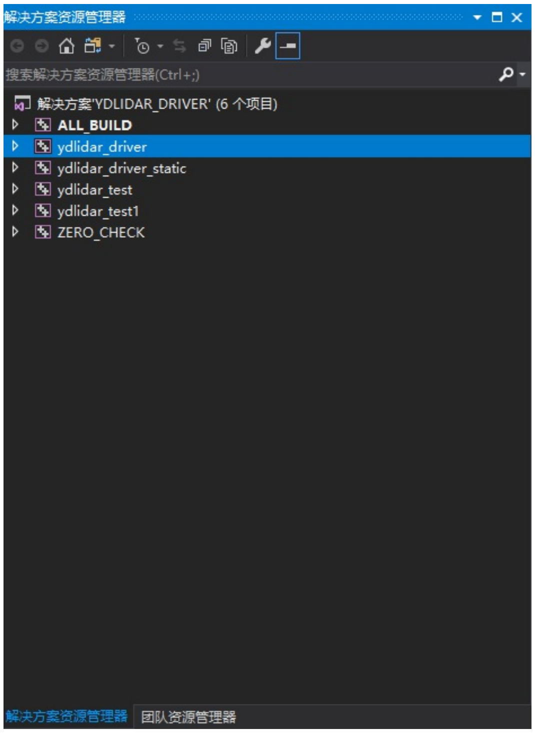
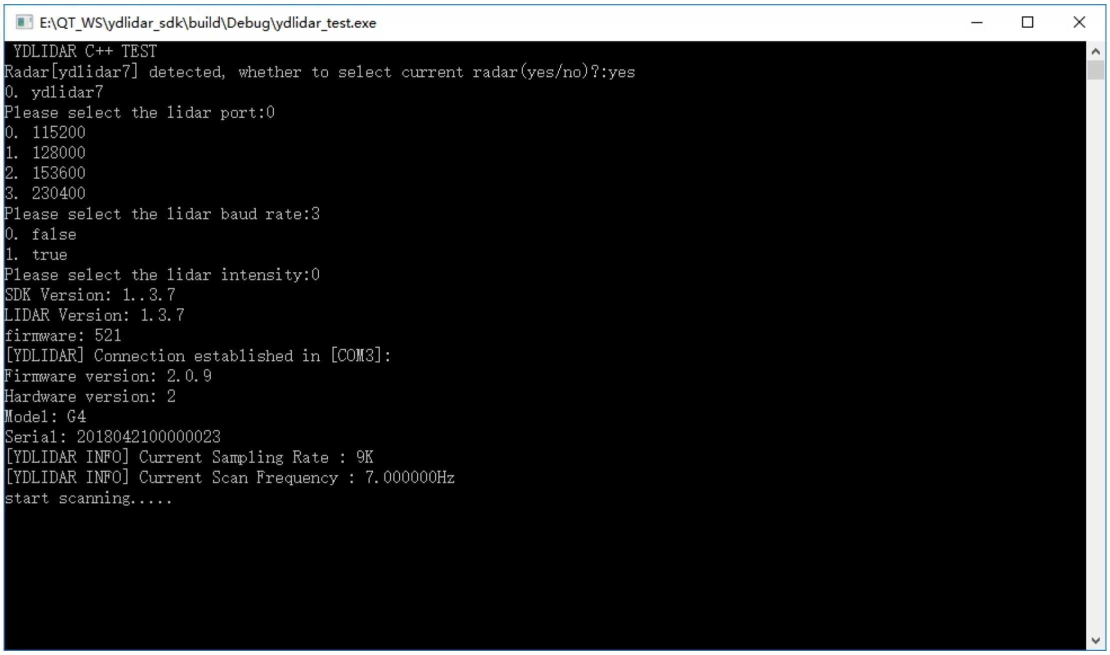

Step5: open vs Project in binaries directory



解决方案'YDLIDAR_DRIVER' (6 个项目)
- ALL_BUILD
- ydlidar_driver
- ydlidar_driver_static
- ydlidar_test
- ydlidar_test1
- ZERO_CHECK

Step6: build finished and run test:



```
 YDLIDAR C++ TEST
Radar[ydlidar7] detected, whether to select current radar(yes/no)?:yes
0. ydlidar7
Please select the lidar port:0
0. 115200
1. 128000
2. 153600
3. 230400
Please select the lidar baud rate:3
0. false
1. true
Please select the lidar intensity:0
SDK Version: 1..3.7
LIDAR Version: 1.3.7
firmware: 521
[YDLIDAR] Connection established in [COM3]:
Firmware version: 2.0.9
Hardware version: 2
Model: G4
Serial: 2018042100000023
[YDLIDAR INFO] Current Sampling Rate : 9K
[YDLIDAR INFO] Current Scan Frequency : 7.000000Hz
start scanning.....
```

i. Compile wth Qt:
   1). Qt configuration cmake
   2). Open the CmakeLists.txt project file with Qt.

How to run YDLIDAR SDK samples

linux:

```
$ ./ydlidar_test

  YDLIDAR C++ TEST

   Radar[ydlidar7] detected, whether to select current radar(yes/no)?:yes

   0. ydlidar7

$ Please select the lidar port:0

  0. 115200

  1. 128000

  2. 153600

  3. 230400

$ Please select the lidar baud rate:3

  0. false

  1. true

$ Please select the lidar intensity:0
```

windows:

```
$ ydlidar_test.exe

  YDLIDAR C++ TEST

   Radar[ydlidar7] detected, whether to select current radar(yes/no)?:yes

   0. ydlidar7

$ Please select the lidar port:0

  0. 115200

  1. 128000

  2. 153600
  3. 230400
$ Please select the lidar baud rate:3
  0. false
  1. true
$ Please select the lidar intensity:0
```

Console Display:

You should see YDLIDAR’s scan result in the console:

```
YDLIDAR C++ TEST
Radar[ydlidar7] detected, whether to select current radar(yes/no)?:yes
0. ydlidar7
Please select the lidar port:0
0. 115200
1. 128000
2. 153600
3. 230400
Please select the lidar baud rate:3
0. false
1. true
Please select the lidar intensity:0
SDK Version: 1..3.7
LIDAR Version: 1.3.7
fhs_lock: creating lockfile:      18341
firmware: 521
[YDLIDAR] Connection established in [/dev/ttyUSB0]:
Firmware version: 2.0.9
Hardware version: 2
Model: G4
Serial: 2018042100000023
[YDLIDAR INFO] Current Sampling Rate : 9K
[YDLIDAR INFO] Current Scan Frequency : 7.000000Hz
received scan size: 1039
scan   system time: 1534400129245291000
scan     self time: 1534400129103710800
scan     frequency: 8.67053HZ
received scan size: 1231
scan   system time: 1534400129379541000
scan     self time: 1534400129232496800
scan     frequency: 7.31708HZ
received scan size: 1272
scan   system time: 1534400129530262000
scan     self time: 1534400129378863800
scan     frequency: 7.08105HZ
```

```
received scan size: 1295

scan   system time: 1534400129671749000

scan     self time: 1534400129519748800

scan     frequency: 6.95518HZ

^Csignal_handler(2)

received scan size: 1341

scan   system time: 1534400129839365000

scan     self time: 1534400129671106800

scan     frequency: 6.71642HZ

fhs_unlock: Removing LockFile
```

Note: If you have already run the program once. change the configuration parameters through the “lidar.ini” file.

Data structure

data structure:

```
//! A struct for returning configuration from the YDLIDAR
struct LaserConfig {

    //! Start angle for the laser scan [rad].  0 is forward and angles are measured clockwise when viewing YDLIDAR from the top.
    float min_angle;

    //! Stop angle for the laser scan [rad].   0 is forward and angles are measured clockwise when viewing YDLIDAR from the top.
    float max_angle;

    //! Scan resolution [rad].
    float ang_increment;

    //! Scan resoltuion [ns]
    float time_increment;

    //! Time between scans
    float scan_time;

    //! Minimum range [m]
    float min_range;

    //! Maximum range [m]
    float max_range;

    //! Range Resolution [m]
    float range_res;

  };


  struct LaserScan {

    //! Array of ranges
    std::vector<float> ranges;

    //! Array of intensities
    std::vector<float> intensities;

    //! Self reported time stamp in nanoseconds
    uint64_t self_time_stamp;

    //! System time when first range was measured in nanoseconds
    uint64_t system_time_stamp;

    //! Configuration of scan
    LaserConfig config;

     ///lidar scan frequency
 float scan_frequency;

  };
```

example angle parsing:

```
for(size_t i =0; i < scan.ranges.size(); i++) {
  // current angle
  double angle = scan.config.min_angle + i*scan.config.ang_increment;// radian format

  //current distance
  double distance = scan.ranges[i];//meters

  //current intensity
  int intensity = scan.intensities[i];

}
```

laser callback function code :

```
  void LaserScanCallback(const LaserScan& scan) {

      std::cout<< "received scan size: "<< scan.ranges.size()<<std::endl;

      std::cout<< "scan   system time: "<< scan.system_time_stamp<<std::endl;

      std::cout<< "scan     self time: "<< scan.self_time_stamp<<std::endl;

      std::cout<< "scan     frequency: "<< 1000000000.0/scan.config.scan_time << "HZ"<<std::endl;

      std::cout<< "lidar    frequency: "<< scan.scan_frequency << "HZ"<<std::endl;


      for(size_t i =0; i < scan.ranges.size(); i++) {

        // current angle
        double angle = scan.config.min_angle + i*scan.config.ang_increment;// radian format

        //current distance
        double distance = scan.ranges[i];//meters

        //current intensity
        int intensity = scan.intensities[i];

      }

    }
```

Quick Start

The best way to learn how to use sdk is to follow the tutorials in our sdk guide:

https://github.com/yangfuyuan/ydlidar_sdk/Samples

If you want to learn from code examples, take a look at the examples in the Samples directory.

Simple Usage

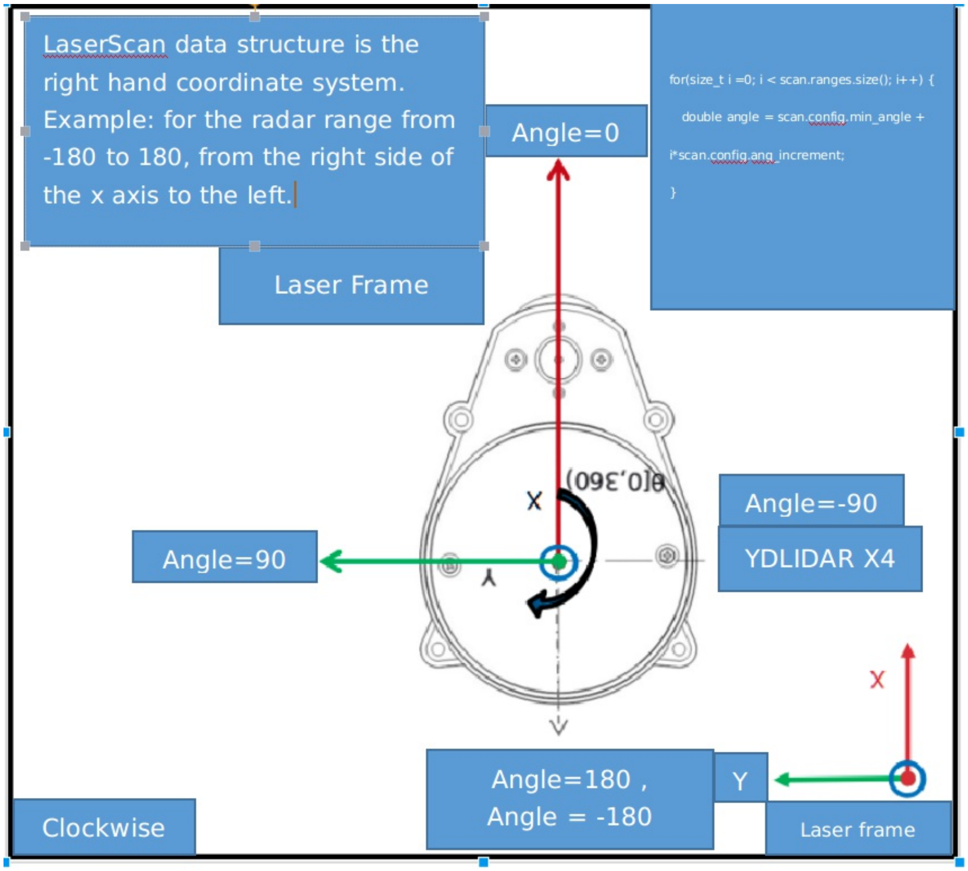
```
    try {

        LIDAR ydlidar;

        LaserParamCfg cfg;

        ydlidar.RegisterLIDARDataCallback(&LaserScanCallback);

        ydlidar.UpdateLidarParamCfg(cfg);

         while(ydlidar::ok()){

             try {

                 ydlidar.spinOnce();

             }catch(TimeoutException& e) {

                 std::cout<< e.what()<<std::endl;

             }catch(CorruptedDataException& e) {

                 std::cout<< e.what()<<std::endl;

             }catch(DeviceException& e) {

                 std::cout<< e.what()<<std::endl;
                 break;
             }

         }

    }catch(TimeoutException& e) {

        std::cout<< e.what()<<std::endl;

    }catch(CorruptedDataException& e) {

        std::cout<< e.what()<<std::endl;

    }catch(DeviceException& e) {

        std::cout<< e.what()<<std::endl;

    }
```

Note: Use sdk to be a “try catch” syntax to do exception handling.

Get Lidar List:

```
std::vector<string> ports =  YDlidarDriver::lidarPortList();

for(std::vector<string>::iterator it = ports.begin(); it != ports.end(); it++) {

        printf("%s\n",  (*it).c_str());

 }
```

Coordinate System



LaserScan data structure is the right hand coordinate system. Example: for the radar range from -180 to 180, from the right side of the x axis to the left.

```
for(size_t i =0; i < scan.ranges.size(); i++) {

   double angle = scan.config.min_angle +

i*scan.config.ang_increment;

}
```

LaserScan data structure radar coordinate system

The relationship between the angle value and the data structure in the above figure:

```
double current_angle =  scan.config.min_angle + index*scan.config.ang_increment;// radian format
doube Angle = current_angle*180/M_PI;//Angle fomat
```

Contact EAI

If you have any extra questions, please feel free to contact us