MYNT EYE D SDK Documentation

version 1.7.3

MYNTAI

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目录

MYNT® EYE D SDK

MYNT® EYE 产品说明

产品介绍

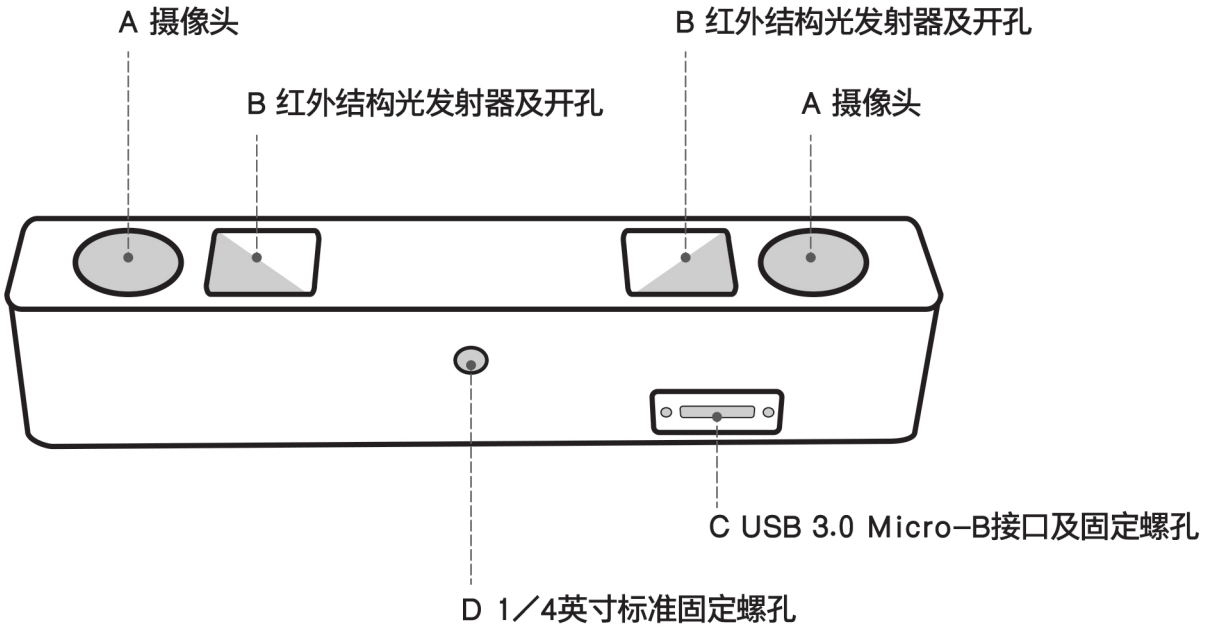
作为基于视觉识别技术的3D传感器，小觅双目摄像头深度版可适用于室内外双重环境。无惧室外强光环境，完全黑暗的室内环境亦可工作。标配的IR主动光，可以完美解决了室内白墙和无纹理物体的识别难题。“双目+IMU”的惯性导航方案，可为VSLAM的应用提供精准的六轴互补数据，并且相较其他单一方案拥有更高精度和鲁棒性。此外，小觅双目摄像头深度版产品（MYNT EYE Depth）还提供丰富的SDK接口和VSLAM开源项目支持，可以帮助客户迅速进行方案集成，加速实现产品研发进程，实现方案的快速产品化和落地。

小觅双目摄像头深度版（MYNT EYE Depth）可广泛应用于视觉定位导航（vSLAM）领域，包括：无人车和机器人的视觉实时定位导航系统、无人机视觉定位系统、无人驾驶避障导航系统、增强现实（AR）、虚拟现实（VR）等；双目也可应用于视觉识别领域，包括：立体人脸识别、三维物体识别、空间运动追踪、三维手势与体感识别等；应用于测量领域，包括：辅助驾驶系统（ADAS）、双目体积计算、工业视觉筛检等。

为保证摄像头产品输出数据质量，产品出厂时，我们已对双目以及IMU进行标定。同时，产品通过富士康实验室的高温高湿持续工作、高温高湿持续操作、低温动态老化、高温工作、低温存储、整机冷热冲击、正弦振动、随机振动等多项产品质量测试，保证品质的稳定和可靠。除了产品和技术的研发，亦可直接应用于产品量产，加速从研发到产品化的过程。

产品外观

外壳(mm)	PCBA板(mm)
165x31.5x29.6	149x24



A. 摄像头：摄像头传感器镜头，在使用中请注意保护，以避免成像质量下降。

B. 红外结构光发射器及开孔：通过红外结构光可有效解决白墙等无纹理表面的视觉计算。(非 IR 版，此孔保留，但内部无结构光发射装置)

C. USB Micro-B 接口及固定孔：使用中，插上 USB Micro-B数据线后，请使用接口端的螺丝紧固接口，以避免使用中损坏接口，也保证数据连接的稳定性。

D. 1/4 英寸标准固定螺孔：用于将双目摄像头固定于摄影三角架等装置。

D1000-IR-120/Color规格

产品参数

型号	D1000-IR-120/Color
尺寸	PCB dimension:150x24mm, Total dimension:165x31.5x30.12mm
帧率	Up to 60FPS
分辨率	2560x720;1280x480
深度分辨率	On chip 1280x720 640x480
像素尺寸	3.75x3.75μm
基线	120.0mm
镜头	Replacable Standard M12
视角	D:121° H:105° V:58°
焦距	2.45mm
支持IR	Yes
IR可探测距离	3m
色彩模式	Color
深度工作距离	0.37-8m
快门类型	Global Shutter
功耗	1.9~3.5W@5V DC from USB
输出数据格式	YUYV/MJPG

接口	USB2.0/3.0
重量	184g
UVC MODE	Yes

环境

运行温度	-10° C~60° C
存储温度	-20° C~70° C

D1000-50/Color规格

产品参数

型号	D1000-50/Color
尺寸	PCB dimension:150x24mm, Total dimension:165x31.5x30.12mm
帧率	Up to 60FPS
分辨率	2560x720;1280x480
深度分辨率	On chip 1280x720 640x480
像素尺寸	3.75x3.75μm
基线	120.0mm
镜头	Replacable Standard M12
视角	D:70° H:64° V:38°
焦距	2.45mm
支持IR	Yes
IR可探测距离	3m
色彩模式	Color
深度工作距离	0.52-15m
快门类型	Global Shutter
功耗	1.8W@5V DC from USB
输出数据格式	YUYV/MJPG
接口	USB2.0/3.0
重量	152g
UVC MODE	Yes

环境

运行温度	-10° C~60° C
存储温度	-20° C~70° C

图像分辨率支持列表

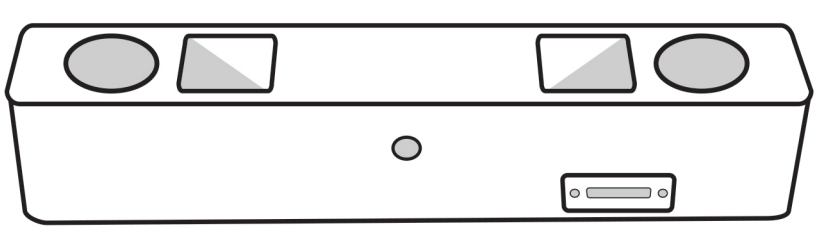
mode	interface	color resolution	color fps	depth resolution	depth fps
L’ +D	USB3.0	1280x720	60/30/20/10	1280x720	60/30/20/10
L’ +D	USB3.0	640x480	60/30	640x480	60/30
L’ +R’ +D	USB3.0	2560x720	30	1280x720	30
L’ +R’ +D	USB3.0	1280x480	60/30	640x480	60/30
L+D	USB3.0	1280x720	60/30/20/10	1280x720	60/30/20/10
L+D	USB3.0	640x480	60/30	640x480	60/30
L+R+D	USB3.0	2560x720	30	1280x720	30
L+R+D	USB3.0	1280x480	60/30	640x480	60/30
L+R	USB3.0	2560x720	30	not open	null
L’ +R’	USB3.0	2560x720	30	not open	null
D	USB3.0	not open	null	1280x720	60/30
D	USB3.0	not open	null	640x480	60/30
L+R	USB2.0	2560x720	5	not open	null
L’ +R’	USB2.0	2560x720	5	not open	null
L+R	USB2.0	1280x480	15	not open	null
L’ +R’	USB2.0	1280x480	15	not open	null
L’ +D	USB2.0	1280x720	5	640x720	5
L’ +D	USB2.0	640x480	15	320x480	15

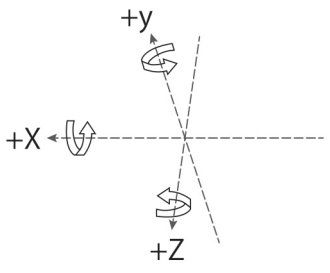
L+D	USB2.0	1280x720	5	640x720	5
L+D	USB2.0	640x480	15	320x480	15
L’	USB2.0	1280x720	5	not open	null
L	USB2.0	1280x720	5	not open	null
D	USB2.0	not open	null	640x720	5
D	USB2.0	not open	null	320x480	15
L+R	USB2.0/MJPG	2560x720	5	not open	null
L+R	USB2.0/MJPG	1280x480	15	not open	null
L	USB2.0/MJPG	1280x720	5	not open	null

> 注解
>
> L’=left rectify image, L=left image,R’=right rectify image, R=right image,D=depth image
>
> 在IR Depth Only模式下，帧率只支持15fps和30fps.

IMU 坐标系统

IMU 坐标系统为右手系，坐标轴方向如下：





MYNT® EYE 附件

产品附件包含：双目*1、数据线*1

为了更好的支持您的开发，我们还提供双目支架，您可以在我们的天猫旗舰店 mynt小觅旗舰店 进行购买。

MYNT® EYE SDK 安装

SDK 更新日志

2019-03-25 v1.7.4

1、修复了ros camera info 不同设备兼容问题。

2、修复了 Ubuntu18.04 特定 opencv 版本编译问题。

2019-03-18 v1.7.3

1、增加对外部传感器（超声波传感器，GPS）的支持。

2、depth与color图根据frame id同步。

3、增加兼容USB2.0的范例。

4、修复ROS下左右目发布camera info帧率为正常值两倍的问题。

5、文档优化。

支持平台

SDK是基于CMake构建的，用以Linux，Windows等多个平台。SDK提供两种安装方式：下载安装以及源码安装编译方式。

已测试可用的平台有：

```
* Windows 10
* Ubuntu 18.04/16.04
* Jetson TX1 TX2 Xavier
* RK3399
```

> **技巧**
>
> ubuntu系统仅支持源码编译安装。 仅支持64 bit系统。

> **警告**
>
> 由于硬件传输速率要求，请尽量使用USB3.0接口。另外，虚拟机因大多存在USB驱动兼容性问题，不建议使用。

Linux SDK 用户指南

1. 安装 SDK 依赖

1.1 安装 OpenCV

如果您已经安装了 opencv 或者您想要使用 ROS，您可以跳过这步.

1.1.1 apt 或者编译安装 OpenCV (选择一个)

1.1.1.1 使用 apt 安装 OpenCV (推荐)

```
sudo apt-get install libopencv-dev
```

1.1.1.2 编译安装 OpenCV

OpenCV 如何编译安装，请见官方文档 Installation in Linux。或参考如下命令：

```
[compiler] sudo apt-get install build-essential
[required] sudo apt-get install cmake git libgtk2.0-dev pkg-config libavcodec-dev libavformat-dev libswscale-dev
[optional] sudo apt-get install python-dev python-numpy libtbb2 libtbb-dev libjpeg-dev libpng-dev libtiff-dev libjasper-dev libdc1394-22-dev
```

```
git clone https://github.com/opencv/opencv.git
cd opencv/
git checkout tags/3.4.5

cd opencv/
mkdir build
cd build/

cmake ..

make -j4
sudo make install
```

1.2 安装点云例程依赖的 PCL 库 (可选)

```
sudo apt-get install libpcl-dev libproj-dev libopenni2-dev libopenni-dev
```

1.3 建立 libGL.so 软链接用以解决在 TX1/TX2 上的 bug (可选)

```
sudo ln -sf /usr/lib/aarch64-linux-gnu/tegra/libGL.so /usr/lib/aarch64-linux-gnu/libGL.so
```

2. 编译 SDK

MYNT® EYE SDK 安装

```
git clone https://github.com/slightech/MYNT-EYE-D-SDK.git
cd MYNT-EYE-D-SDK
```

2.1 初始化 SDK

> 注解
>
> 因为设备权限的问题，命令执行完成之后，您必须重新拔插设备(这个操作在同一台电脑上，只需要做一次)。

```
make init
```

2.2 编译 SDK

```
make all
```

3. 运行例程

> 注解
>
> 默认打开矫正后的图像。(跑vio时需要使用原图，跑深度或者点云使用矫正后的图像)

1. get_image 显示左目的图像和彩色深度图 (兼容USB2.0)

```
./samples/_output/bin/get_image
```

2. get_stereo_image 显示左右目的图像和彩色深度图

```
./samples/_output/bin/get_stereo_image
```

3. get_depth 显示左目的图像，16UC1的深度图和鼠标选中的像素的深度值(mm)

```
./samples/_output/bin/get_depth
```

4. get_points 显示左目的图像，16UC1的深度图和点云

```
./samples/_output/bin/get_points
```

5. get_imu 打印 imu 数据

```
./samples/_output/bin/get_imu
```

6. get_img_params 打印相机参数并保存在文件中

```
./samples/_output/bin/get_img_params
```

7. get_imu_params 打印 imu 参数并保存在文件中

```
./samples/_output/bin/get_imu_params
```

8. get_from_callbacks 使用回调方式获取图像和 imu 数据

```
./samples/_output/bin/get_from_callbacks
```

9. get_all_with_options 使用不同参数打开设备

```
./samples/_output/bin/get_all_with_options
```

4 安装带有 OpenCV 的 ROS

如果您不使用 ROS(The Robot Operation System), 您可以跳过此部分.

4.1 安装 ROS Kinectic 版本

MYNT® EYE SDK 安装

```
cd ~
wget https://raw.githubusercontent.com/oroca/oroca-ros-pkg/master/ros_install.sh && \
chmod 755 ./ros_install.sh && bash ./ros_install.sh catkin_ws kinetic
```

> 注解
>
> ROS Kinetic 会自动安装 OpenCV, JPEG.

4.2 编译 ROS Wrapper

```
make ros
```

Core:

```
roscore
```

RViz Display:

```
source ./wrappers/ros/devel/setup.bash
roslaunch mynteye_wrapper_d display.launch
```

Publish:

```
source ./wrappers/ros/devel/setup.bash
roslaunch mynteye_wrapper_d mynteye.launch
```

Subscribe:

```
source ./wrappers/ros/devel/setup.bash
rosrun mynteye_wrapper_d mynteye_listener_d
```

4.3 编译内测版设备 ROS Wrapper

```
make ros
```

Core:

```
roscore
```

RViz Display:

```
source ./wrappers/beta_ros/devel/setup.bash
roslaunch mynteye_wrapper_d_beta display.launch
```

Publish:

```
source ./wrappers/beta_ros/devel/setup.bash
roslaunch mynteye_wrapper_d_beta mynteye.launch
```

Subscribe:

```
source ./wrappers/beta_ros/devel/setup.bash
rosrun mynteye_wrapper_d_beta mynteye_listener_d_beta
```

5. 打包

如果打包指定版本OpenCV的包：

```
cd <sdk>
make cleanall
export OpenCV_DIR=<install prefix>

export OpenCV_DIR=/usr/local
export OpenCV_DIR=$HOME/opencv-2.4.13.3
```

Packaging:

```
cd <sdk>  #<sdk>为SDK所在路径
make pkg
```

6. 清理

```
cd <sdk>  #<sdk>为SDK所在路径
make cleanall
make uninstall
```

Windows SDK 用户指南

以下源码编译安装过程。如果只需使用预编译好的库，请参考 Windows 预编译 exe 安装。

1. 安装编译工具

1.1 安装 Visual Studio

从 https://visualstudio.microsoft.com/ 下载并安装

> 技巧
>
> 支持Visual Studio 2015 和 Visual Studio 2017.

1.2 安装 CMake

从 https://cmake.org/ 下载并安装

1.3 安装 MSYS2

1. 从 http://mirrors.ustc.edu.cn/msys2/distrib/x86_64/ 下载并安装
2. 将 bin 目录的路径添加到系统变量的 PATH 变量列表中

```
C:\msys64\usr\bin
```

3. 安装 make

```
pacman -Syu
pacman -S make
```

安装完成后，可在命令行提示符（Command Prompt）里运行如下命令：

```
>make --version
GNU Make 4.2.1
```

2. 安装 SDK 依赖

2.1 安装 OpenCV

2.1.1 用预先建立的库安装OpenCV (Recommend)

*更多信息您可以参考 OpenCV 官方文档 *

1. 进入 OpenCV 源码页 http://sourceforge.net/projects/opencvlibrary/files/opencv-win/
2. 下载一个您想要安装的安装包. 例如 3.4.2/opencv-3.4.2-vc14_vc15.exe
3. 使用管理员权限运行安装包
4. 安装完成之后，设置 OpenCV 环境变量并添加到系统的 path 变量中

2.1.2 设置环境变量

使用管理员权限开启 cmd, 输入以下命令来添加OPENCV_DIR变量到系统变量中:

将 “D:OpenCV” 替换为您自己的解压缩目录

```
setx -m OPENCV_DIR D:\OpenCV\Build\x64\vc14\lib     (Visual Studio 2015 使用该命令)
setx -m OPENCV_DIR D:\OpenCV\Build\x64\vc15\lib     (Visual Studio 2017 使用该命令)
```

将 OpenCV bin 路径添加到系统环境变量的 PATH 变量列表中

```
D:\OpenCV\Build\x64\vc14\bin     (Visual Studio 2015 使用该路径)
D:\OpenCV\Build\x64\vc15\bin     (Visual Studio 2017 使用该路径)
```

2.2 安装 libjpeg-turbo

1. 从 https://sourceforge.net/projects/libjpeg-turbo/files/ 下载 libjpeg-turbo 并安装
2. 将 bin 目录的路径添加到系统变量的 PATH 变量列表中

```
C:\libjpeg-turbo64\bin
```

2.3 安装点云例程依赖的 PCL 库 (可选)

从 https://github.com/PointCloudLibrary/pcl/releases 下载集成安装程序(PCL + dependencies)

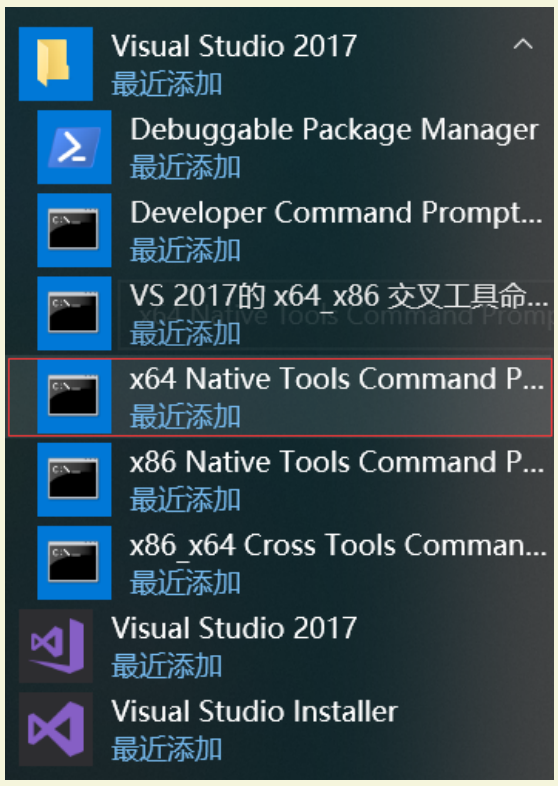
3. 编译 SDK

打开 “x64 Native Tools Command Prompt for VS 2017”(适用于 VS 2017 的 x64 本机工具命令提示) 命令行界面

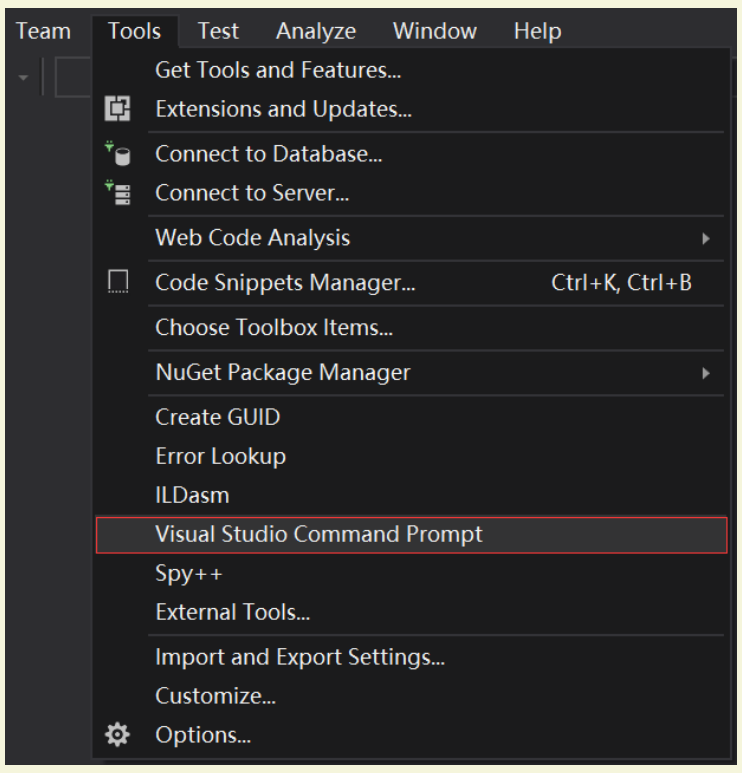
```
git clone https://github.com/slightech/MYNT-EYE-D-SDK.git
cd MYNT-EYE-D-SDK
make all
```

技巧

Visual Studio Command Prompt 可以从开始菜单打开，



也可以从 Visual Studio 的工具菜单里打开，



但如 Visual Studio 2015 工具菜单里可能没有，可以自己添加个。

打开 Tools 的 External Tools… ，然后 Add 如下内容：

Field	Value
Title	Visual Studio Command Prompt
Command	C:\Windows\System32\cmd.exe
Arguments	/k "C:\Program Files (x86)\Microsoft Visual Studio 14.0\Common7\Tools\VsDevCmd.bat"
Initial Directory	$(SolutionDir)

4. 运行例程

> 注解
>
> 默认打开矫正后的图像。(跑vio时需要使用原图，跑深度或者点云使用矫正后的图像)

1. get_image 显示左目的图像和彩色深度图 (兼容USB2.0)

```
.\samples\_output\bin\get_image.bat
```

2. get_stereo_image 显示左右目的图像和彩色深度图

```
.\samples\_output\bin\get_stereo_image.bat
```

3. get_depth 显示左目的图像，16UC1的深度图和鼠标选中的像素的深度值(mm)

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4. get_points 显示左目的图像，16UC1的深度图和点云

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5. get_imu 打印 imu 数据

```
.\samples\_output\bin\get_imu
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6. get_img_params 打印相机参数并保存在文件中

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```
.\samples\_output\bin\get_all_with_options
```

5. 清理

```
cd <sdk>   <sdk>为SDK所在路径
make cleanall
```

Windows 预编译 exe 安装

下载地址： mynteye-d-1.7.1-win-x64-opencv-3.4.3.exe Google Drive, 百度网盘

安装完 SDK 的 exe 安装包后，桌面会生成 SDK 根目录的快捷方式。

进入 “binsamples” 目录，双击 “get_image.exe” 运行，即可看到相机画面。

生成样例工程

首先，安装好 Visual Studio 2017 https://visualstudio.microsoft.com/ 和 CMake https://cmake.org/ 。

接着，进入 “samples`” 目录， 双击 “generate.bat” 即可生成样例工程 _build\mynteye_samples.sln 。

> 技巧
>
> 运行样例需要先右键样例，设为启动项目，然后使用Release x64运行。

如何于 Visual Studio 2017 下使用 SDK

进入 <SDK_ROOT_DIR>\projects\vs2017 ，见 “README.md” 说明。

ROS 安装

1.1 安装 ROS Kinectic 版本

MYNT® EYE SDK 安装

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```

ROS Kinetic 会自动安装 OpenCV, JPEG.

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```

RViz Display:

```
source ./wrappers/ros/devel/setup.bash
roslaunch mynteye_wrapper_d display.launch
```

Publish:

```
source ./wrappers/ros/devel/setup.bash
roslaunch mynteye_wrapper_d mynteye.launch
```

Subscribe:

```
source ./wrappers/ros/devel/setup.bash
rosrun mynteye_wrapper_d mynteye_listener_d
```

1.3 编译内测版设备 ROS Wrapper

```
make ros
```

Core:

```
roscore
```

RViz Display:

```
source ./wrappers/beta_ros/devel/setup.bash
roslaunch mynteye_wrapper_d_beta display.launch
```

Publish:

```
source ./wrappers/beta_ros/devel/setup.bash
roslaunch mynteye_wrapper_d_beta mynteye.launch
```

Subscribe:

```
source ./wrappers/beta_ros/devel/setup.bash
rosrun mynteye_wrapper_d_beta mynteye_listener_d_beta
```

ROS 如何使用

按照 ROS 安装，编译再运行节点。

rostopic list 可以列出发布的节点：

```
/mynteye/depth/camera_info
/mynteye/depth/image_raw
/mynteye/depth/image_raw/compressed
/mynteye/depth/image_raw/compressed/parameter_descriptions
/mynteye/depth/image_raw/compressed/parameter_updates
/mynteye/depth/image_raw/compressedDepth
/mynteye/depth/image_raw/compressedDepth/parameter_descriptions
/mynteye/depth/image_raw/compressedDepth/parameter_updates
/mynteye/depth/image_raw/theora
/mynteye/depth/image_raw/theora/parameter_descriptions
/mynteye/depth/image_raw/theora/parameter_updates
/mynteye/imu/data_raw
/mynteye/imu/data_raw_processed
/mynteye/left/camera_info
/mynteye/left/image_color
/mynteye/left/image_color/compressed
...
```

rostopic hz <topic> 可以检查是否有数据：

```
subscribed to [/mynteye/imu/data_raw]
average rate: 202.806
    min: 0.000s max: 0.021s std dev: 0.00819s window: 174
average rate: 201.167
    min: 0.000s max: 0.021s std dev: 0.00819s window: 374
average rate: 200.599
    min: 0.000s max: 0.021s std dev: 0.00819s window: 574
average rate: 200.461
    min: 0.000s max: 0.021s std dev: 0.00818s window: 774
average rate: 200.310
    min: 0.000s max: 0.021s std dev: 0.00818s window: 974
  ...
```

rostopic echo <topic> 可以打印发布数据等。了解更多，请阅读 rostopic 。

ROS 封装的文件结构，如下所示：

```
<sdk>/wrappers/ros/
├──src/
   └──mynteye_wrapper_d/
      ├──launch/
      |   ├──display.launch
      |   └──mynteye.launch
      ├──msg/
      ├──rviz/
      ├──src/
      |   ├──mynteye_listener.cc
      |   └──mynteye_wrapper_nodelet.cc
      |   └──mynteye_wrapper_node.cc
      |   └──pointcloud_generatort.cc
      |   └──pointcloud_generator.h
      ├──CMakeLists.txt
      ├──nodelet_plugins.xml
      └──package.xml
```

其中 mynteye.launch 里，可以配置发布的 topics 与 frame_ids 、决定启用哪些数据、以及设定控制选项。其中，gravity 请配置成当地重力加速度。

```
<arg name="gravity" default="9.8" />
```

MYNT® EYE SDK 样例

获取双目图像

API 通过 DeviceMode::DEVICE_COLOR 参数获取图像数据，或者 DeviceMode::DEVICE_ALL 同时捕获图像和深度数据。

通过 GetStreamData() 函数，就能获取想要的数据。

参考代码片段：

```
// Device mode, default DEVICE_ALL
//   DEVICE_COLOR: IMAGE_LEFT_COLOR y IMAGE_RIGHT_COLOR - IMAGE_DEPTH n
//   DEVICE_DEPTH: IMAGE_LEFT_COLOR n IMAGE_RIGHT_COLOR n IMAGE_DEPTH y
//   DEVICE_ALL:   IMAGE_LEFT_COLOR y IMAGE_RIGHT_COLOR - IMAGE_DEPTH y
// Note: y: available, n: unavailable, -: depends on #stream_mode
params.dev_mode = DeviceMode::DEVICE_DEPTH;


auto left_color = cam.GetStreamData(ImageType::IMAGE_LEFT_COLOR);
    if (left_color.img) {
    cv::Mat left = left_color.img->To(ImageFormat::COLOR_BGR)->ToMat();
    painter.DrawSize(left, CVPainter::TOP_LEFT);
    painter.DrawStreamData(left, left_color, CVPainter::TOP_RIGHT);
    painter.DrawInformation(left, util::to_string(counter.fps()),
        CVPainter::BOTTOM_RIGHT);
    cv::imshow("left color", left);
```

完整代码样例，请见get_stereo_image.cc 。

获取双目图像(兼容USB2.0)

兼容 USB2.0，自动更改为USB2.0适用的分辨率和帧率。API 通过 DeviceMode::DEVICE_COLOR 参数获取图像数据，或者 DeviceMode::DEVICE_ALL 同时捕获图像和深度数据。

通过 GetStreamData() 函数，就能获取想要的数据。

参考代码片段：

```
// Device mode, default DEVICE_ALL
//   DEVICE_COLOR: IMAGE_LEFT_COLOR y IMAGE_RIGHT_COLOR - IMAGE_DEPTH n
//   DEVICE_DEPTH: IMAGE_LEFT_COLOR n IMAGE_RIGHT_COLOR n IMAGE_DEPTH y
//   DEVICE_ALL:   IMAGE_LEFT_COLOR y IMAGE_RIGHT_COLOR - IMAGE_DEPTH y
// Note: y: available, n: unavailable, -: depends on #stream_mode
params.dev_mode = DeviceMode::DEVICE_DEPTH;
```

```
auto left_color = cam.GetStreamData(ImageType::IMAGE_LEFT_COLOR);
    if (left_color.img) {
    cv::Mat left = left_color.img->To(ImageFormat::COLOR_BGR)->ToMat();
    painter.DrawSize(left, CVPainter::TOP_LEFT);
    painter.DrawStreamData(left, left_color, CVPainter::TOP_RIGHT);
    painter.DrawInformation(left, util::to_string(counter.fps()),
        CVPainter::BOTTOM_RIGHT);
    cv::imshow("left color", left);
```

完整代码样例，请见 get_image.cc 。

获取深度图像

深度图像，属于上层合成数据。

可以通过设置depth_mode来改变深度图显示。

```
// Depth mode: colorful(default), gray, raw
params.depth_mode = DepthMode::DEPTH_RAW;
```

然后使用GetStreamData()获取。另外，判断不为空后再使用。

参考代码片段：

```
auto image_depth = cam.GetStreamData(ImageType::IMAGE_DEPTH);
if (image_depth.img) {
  cv::Mat depth = image_depth.img->To(ImageFormat::DEPTH_RAW)->ToMat();

  cv::setMouseCallback("depth", OnDepthMouseCallback, &depth_region);
  // Note: DrawRect will change some depth values to show the rect.
  depth_region.DrawRect(depth);
  cv::imshow("depth", depth);

  depth_region.ShowElems<ushort>(depth, [](const ushort& elem) {
    return std::to_string(elem);
  }, 80, depth_info);
}
```

上述代码，用了 OpenCV 来显示图像。选中显示窗口时，按 ESC/Q 就会结束程序。

> **注解**
>
> get_depth样例仅支持使用DEPTH_RAW模式，可以修改其他样例的depth_mode来获得其他模式的深度图。

完整代码样例，请见get_depth.cc 。

获取点云图像

点云图像，属于上层合成数据。API使用GetStreamData()获取。另外，判断不为空后再使用。

参考代码片段：

```
auto image_color = cam.GetStreamData(ImageType::IMAGE_LEFT_COLOR);
auto image_depth = cam.GetStreamData(ImageType::IMAGE_DEPTH);
if (image_color.img && image_depth.img) {
    cv::Mat color = image_color.img->To(ImageFormat::COLOR_BGR)
        ->ToMat();
    painter.DrawSize(color, CVPainter::TOP_LEFT);
    painter.DrawStreamData(color, image_color, CVPainter::TOP_RIGHT);
    painter.DrawInformation(color, util::to_string(counter.fps()),
        CVPainter::BOTTOM_RIGHT);

    cv::Mat depth = image_depth.img->To(ImageFormat::DEPTH_RAW)
        ->ToMat();

    cv::imshow("color", color);

    viewer.Update(color, depth);
}
```

上述代码，用了 PCL 来显示点云。关闭点云窗口时，也会结束程序。

完整代码样例，请见get_points.cc。

获取IMU数据

使用EnableMotionDatas()来启用缓存，才能通过GetMotionDatas()函数来获取到IMU数据。否则，只能通过回调接口得到IMU数据，请参阅 从回调接口获取数据。

参考代码片段：

```
auto motion_datas = cam.GetMotionDatas();
if (motion_datas.size() > 0) {
    std::cout << "Imu count: " << motion_datas.size() << std::endl;
    for (auto data : motion_datas) {
        if (data.imu) {
            if (data.imu->flag == MYNTEYE_IMU_ACCEL) {
                counter.IncrAccelCount();
                std::cout << "[accel] stamp: " << data.imu->timestamp
                    << ", x: " << data.imu->accel[0]
                    << ", y: " << data.imu->accel[1]
                    << ", z: " << data.imu->accel[2]
                    << ", temp: " << data.imu->temperature
                    << std::endl;
            } else if (data.imu->flag == MYNTEYE_IMU_GYRO) {
                counter.IncrGyroCount();
                std::cout << "[gyro] stamp: " << data.imu->timestamp
                << ", x: " << data.imu->gyro[0]
                << ", y: " << data.imu->gyro[1]
                << ", z: " << data.imu->gyro[2]
                << ", temp: " << data.imu->temperature
                << std::endl;
            } else {
                std::cerr << "Imu type is unknown" << std::endl;
            }
        } else {
          std::cerr << "Motion data is empty" << std::endl;
        }
    }
    std::cout << std::endl;
}
```

上述代码，用了 OpenCV 来显示图像和数据。选中显示窗口时，按 ESC/Q 就会结束程序。

完整代码样例，请见get_imu.cc 。

从回调接口获取数据

API提供了 SetStreamCallback()， SetMotionCallback() 函数，来设定各类数据的回调。

参考代码片段：

```
cam.SetImgInfoCallback([](const std::shared_ptr<ImgInfo>& info) {
    std::cout << "  [img_info] fid: " << info->frame_id
        << ", stamp: " << info->timestamp
        << ", expos: " << info->exposure_time << std::endl
        << std::flush;
});
for (auto&& type : types) {
    // Set stream data callback
    cam.SetStreamCallback(type, [](const StreamData& data) {
    std::cout << "  [" << data.img->type() << "] fid: "
        << data.img->frame_id() << std::endl
        << std::flush;
    });
}

// Set motion data callback
cam.SetMotionCallback([](const MotionData& data) {
    if (data.imu->flag == MYNTEYE_IMU_ACCEL) {
        std::cout << "[accel] stamp: " << data.imu->timestamp
        << ", x: " << data.imu->accel[0]
        << ", y: " << data.imu->accel[1]
        << ", z: " << data.imu->accel[2]
        << ", temp: " << data.imu->temperature
        << std::endl;
    } else if (data.imu->flag == MYNTEYE_IMU_GYRO) {
        std::cout << "[gyro] stamp: " << data.imu->timestamp
        << ", x: " << data.imu->gyro[0]
        << ", y: " << data.imu->gyro[1]
        << ", z: " << data.imu->gyro[2]
        << ", temp: " << data.imu->temperature
        << std::endl;
    }
    std::cout << std::flush;
});
```

上述代码，用了 OpenCV 来显示图像和数据。选中显示窗口时，按 ESC/Q 就会结束程序。

完整代码样例，请见 get_from_callbacks.cc。

通过设置参数获取不同类型的数据

get_all_with_options 样例可以通过添加参数来设定当前设备的各类控制值。

get_all_with_options -h 参数说明：

```
Open device with different options.

Options:
  -h, --help            show this help message and exit
  -m, --imu             Enable imu datas

  Open Params:
    The open params

    -i INDEX, --index=INDEX
                        Device index
    -f RATE, --rate=RATE
                        Framerate, range [0,60], [30](STREAM_2560x720),
                        default: 10
    --dev-mode=MODE       Device mode, default 2 (DEVICE_ALL)
                          0: DEVICE_COLOR, left y right - depth n
                          1: DEVICE_DEPTH, left n right n depth y
                          2: DEVICE_ALL,   left y right - depth y
                          Note: y: available, n: unavailable, -: depends on
                        stream mode
    --cm=MODE           Color mode, default 0 (COLOR_RAW)
                          0: COLOR_RAW, color raw
                          1: COLOR_RECTIFIED, color rectified
    --dm=MODE           Depth mode, default 2 (DEPTH_COLORFUL)
                          0: DEPTH_RAW
                          1: DEPTH_GRAY
                          2: DEPTH_COLORFUL
    --sm=MODE           Stream mode of color & depth,
                        default 2 (STREAM_1280x720)
                          0: STREAM_640x480, 480p, vga, left
                          1: STREAM_1280x480, 480p, vga, left+right
                          2: STREAM_1280x720, 720p, hd, left
                          3: STREAM_2560x720, 720p, hd, left+right
    --csf=MODE          Stream format of color,
                        default 1 (STREAM_YUYV)
                          0: STREAM_MJPG
                          1: STREAM_YUYV
    --dsf=MODE          Stream format of depth,
                        default 1 (STREAM_YUYV)
                          1: STREAM_YUYV
    --ae                Enable auto-exposure
    --awb               Enable auto-white balance
    --ir=VALUE          IR intensity, range [0,6], default 0
    --ir-depth          Enable ir-depth-only

  Feature Toggles:
    The feature toggles

    --proc=MODE         Enable process mode, e.g. imu assembly, temp_drift
                          0: PROC_NONE
                          1: PROC_IMU_ASSEMBLY
                          2: PROC_IMU_TEMP_DRIFT
                          3: PROC_IMU_ALL
    --img-info          Enable image info, and sync with image
```

例如 ./samples/_output/bin/get_all_with_options -f 60 --dev-mode=0 --sm=2 显示的是1280x720的60帧左目未矫正图像。

完整代码样例 get_all_with_options.cc 。

获取图像标定参数

通过获取API GetStreamIntrinsics(),GetStreamExtrinsics()函数，可以获取当前打开设备的图像标定参数。

参考代码片段：

```
auto vga_intrinsics = cam.GetStreamIntrinsics(StreamMode::STREAM_1280x480, &in_ok);
auto vga_extrinsics = cam.GetStreamExtrinsics(StreamMode::STREAM_1280x480, &ex_ok);
std::cout << "VGA Intrinsics left: {" << vga_intrinsics.left << "}" << std::endl;
std::cout << "VGA Intrinsics right: {" << vga_intrinsics.right << "}" << std::endl;
std::cout << "VGA Extrinsics left to right: {" << vga_extrinsics << "}" << std::endl;
out << "VGA Intrinsics left: {" << vga_intrinsics.left << "}" << std::endl;
out << "VGA Intrinsics right: {" << vga_intrinsics.right << "}" << std::endl;
out << "VGA Extrinsics left to right: {" << vga_extrinsics << "}" << std::endl;
```

运行结果保存在当前目录下，参考运行结果：

```
VGA Intrinsics left: {width: [640], height: [480], fx: [358.45721435546875000], fy: [359.53115844726562500], cx: [311.12109375000000000], cy: [242.63494873046875000]coeffs: [-0.28297042846679688, 0.06178283691406250, -0.00030517578125000, 0.00218200683593750, 0.00000000000000000]}
VGA Intrinsics right: {width: [640], height: [480], fx: [360.13885498046875000], fy: [360.89624023437500000], cx: [325.11029052734375000], cy: [251.46371459960937500]coeffs: [-0.30667877197265625, 0.08611679077148438, -0.00030136108398438, 0.00155639648437500, 0.00000000000000000]}
VGA Extrinsics left to right: {rotation: [0.99996054172515869, 0.00149095058441162, 0.00875246524810791, -0.00148832798004150, 0.99999880790710449, -0.00030362606048584, -0.00875294208526611, 0.00029063224792480, 0.99996161460876465], translation: [-120.36341094970703125, 0.00000000000000000, 0.00000000000000000]}
```

完整代码样例，请见get_img_params.cc 。

获取IMU标定参数

通过API GetMotionIntrinsics(),GetMotionExtrinsics()函数，可以获取当前打开设备的IMU标定参数。

参考代码片段：

```
auto intrinsics = cam.GetMotionIntrinsics(&in_ok);
std::cout << "Motion Intrinsics: {" << intrinsics << "}" << std::endl;
out << "Motion Intrinsics: {" << intrinsics << "}" << std::endl;
```

运行结果保存在当前目录下，参考运行结果：

完整代码样例，请见get_imu_params.cc 。

设定打开参数

设定图像分辨率

通过设置 params.stream_mode 参数，就可以设定图像的分辨率。

> 注解
>
> 图像分辨率现在支持4种：单目640X480，1280x720 和双目1280x480， 2560x720

参考代码片段:

```
// Stream mode: left color only
// params.stream_mode = StreamMode::STREAM_640x480;  // vga
// params.stream_mode = StreamMode::STREAM_1280x720;  // hd
// Stream mode: left+right color
// params.stream_mode = StreamMode::STREAM_1280x480;  // vga
params.stream_mode = StreamMode::STREAM_2560x720;  // hd
```

设定图像帧率

通过设置 params.framerate 参数，就可以设定图像的帧率。

> 注解
>
> 图像帧率有效值(0-60),分辨率在2560X720时帧率有效值为(30),可以参考 图像分辨率支持列表

参考代码片段:

```
// Framerate: 10(default), [0,60], [30](STREAM_2560x720)
params.framerate = 30;
```

设定图像模式

通过设置 params.color_mode 参数，就可以设定图像的模式。

COLOR_RAW 为原图， COLOR_RECTIFIED 为矫正图。

参考代码片段:

```
// Color mode: raw(default), rectified
// params.color_mode = ColorMode::COLOR_RECTIFIED;
```

设定深度图模式

通过 params.depth_mode 参数，就可以设定深度图的模式。

DEPTH_COLORFUL 为着色后的深度图，DEPTH_GRAY 为灰色深度图， DEPTH_GRAY 为原始深度图。

参考代码片段:

```
// Depth mode: colorful(default), gray, raw
// params.depth_mode = DepthMode::DEPTH_GRAY;
```

启用自动曝光及自动白平衡

通过设置 params.state_ae 和 params.state_awb 为 true ，就可以启动自动曝光和自动白平衡。

默认自动曝光和自动白平衡是启用的，如果想关闭，可以设置参数值为 false 。

参考代码片段：

```
// Auto-exposure: true(default), false
// params.state_ae = false;

// Auto-white balance: true(default), false
// params.state_awb = false;
```

启用IR及其调节

通过设置 params.ir_intensity 参数，就可以设定图像的IR强度。

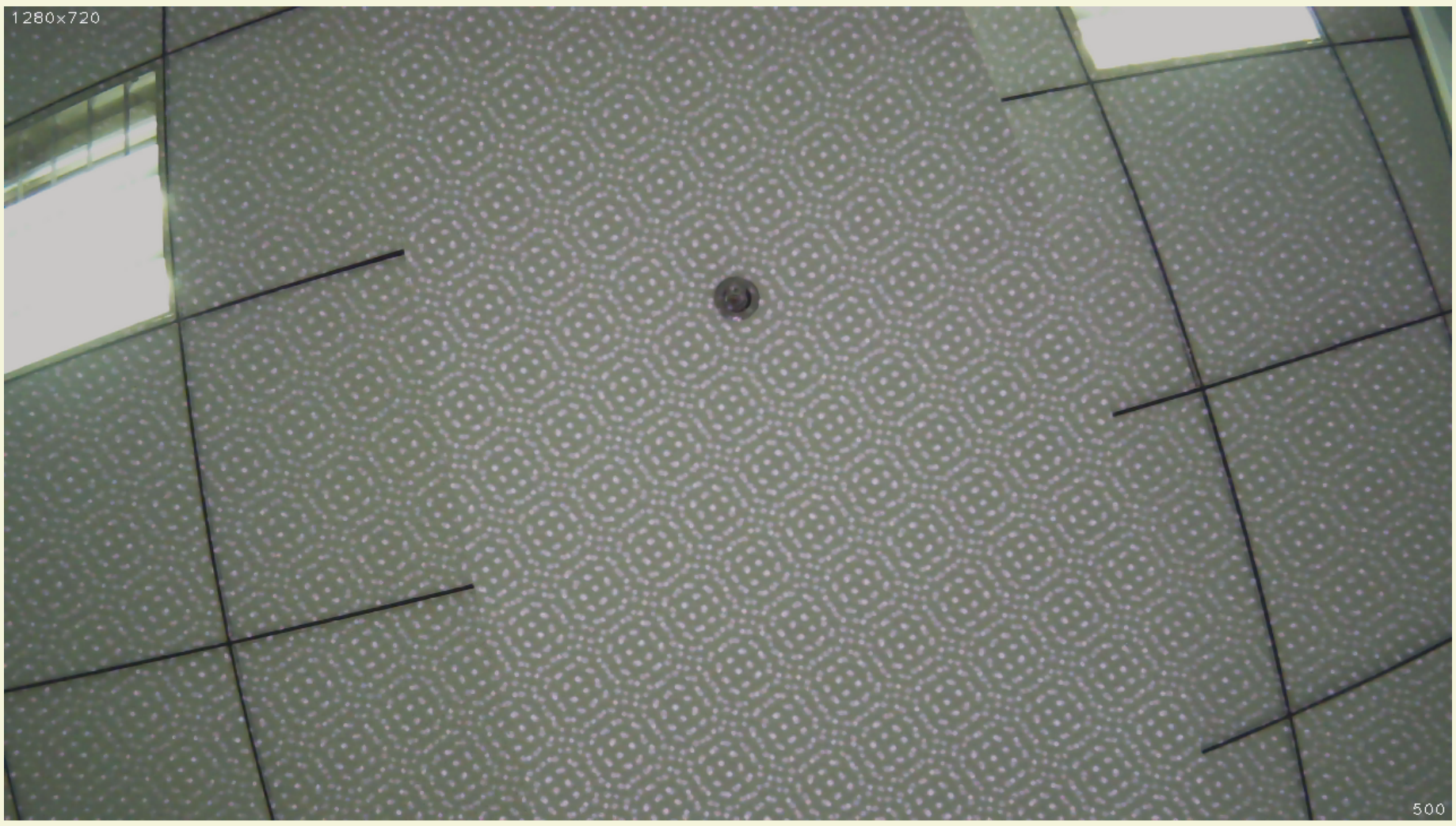
启用IR，就是设定 params.ir_intensity 大于0的值。值越大，强度越高(最大为10)。

参考代码片段：

```
// Infrared intensity: 0(default), [0,10]
params.ir_intensity = 4;
```

注解

启用此功能后，你可以看到ir光斑:



启用IR Depth Only

通过设置 params.ir_depth_only 参数，就可以设定IR Depth Only功能。默认关闭。开启此功能后，IR只作用于深度图像，在图像上不会出现IR光的纹路。

注解

15帧下此功能不生效。 开启此功能帧率会被平分，例如设置图像帧率为30fps时，获取的图像为15fps，深度图也为15fps。

参考代码片段：

```
// IR Depth Only: true, false(default)
// Note: IR Depth Only mode support frame rate between 15fps and 30fps.
//     When dev_mode != DeviceMode::DEVICE_ALL,
//       IR Depth Only mode not be supported.
//     When stream_mode == StreamMode::STREAM_2560x720,
//       frame rate only be 15fps in this mode.
//     When frame rate less than 15fps or greater than 30fps,
//       IR Depth Only mode will be not available.
// params.ir_depth_only = false;
```

调整深度图着色值

通过设置 params.colour_depth_value 参数，默认值是 1000。

参考代码片段:

```
// Colour depth image, default 1000. [0, 16384]
params.colour_depth_value = 1000;
```

以上功能参考运行结果，于 Linux 上：

```
Open device: 0, /dev/video1

D/eSPDI_API: SetPropertyValue control=7 value=0D/eSPDI_API: SetPropertyValue control=7 value=35D/eSPDI_API: SetPropertyValue control=7 value=1-- Auto-exposure state: enabled
D/eSPDI_API: SetPropertyValue control=7 value=0D/eSPDI_API: SetPropertyValue control=7 value=12D/eSPDI_API: SetPropertyValue control=7 value=1-- Auto-white balance state: enabled
-- Framerate: 5
D/eSPDI_API: SetPropertyValue control=7 value=4 SetDepthDataType: 4
-- Color Stream: 1280x720 YUYV
-- Depth Stream: 1280x720 YUYV

D/eSPDI_API: SetPropertyValue control=7 value=0D/eSPDI_API: SetPropertyValue control=7 value=3D/eSPDI_API: SetPropertyValue control=7 value=4
-- IR intensity: 4
D/eSPDI_API: CVideoDevice::OpenDevice 1280x720 fps=5

Open device success
```

> 注解
>
> 更改参数后需要在sdk的目录下运行
>
> ```
> make samples
> ```
>
> 来使设置的参数生效。

完整代码样例 get_image.cc 。

相机控制参数API

打开或关闭自动曝光

```
/** Auto-exposure enabled or not  default enabled*/
bool AutoExposureControl(bool enable);    see "camera.h"
```

打开或关闭自动白平衡

```
/** Auto-white-balance enabled or not  default enabled*/
bool AutoWhiteBalanceControl(bool enable);    see "camera.h"
```

设置 IR 强度

```
/** set infrared(IR) intensity [0, 10] default 4*/
void SetIRIntensity(const std::uint16_t &value);     see "camera.h"
```

设置全局增益

> 注解
>
> 需要在相机打开后关闭自动曝光

```
/** Set global gain [1 - 16]
 * value -- global gain value
 * */
void SetGlobalGain(const float &value);    see "camera.h"
```

设置曝光时间

> 注解
>
> 需要在相机打开后关闭自动曝光

```
/** Set exposure time [1ms - 2000ms]
 * value -- exposure time value
 * */
void SetExposureTime(const float &value);    see "camera.h"
```

参考代码：

```
cam.Open(params);
cam.AutoExposureControl(false);
cam.SetGlobalGain(1);
cam.SetExposureTime(0.3);
```

> 注解
>
> 更改参数后需要在sdk的目录下运行
>
> ```
> make samples
> ```
>
> 来使设置的参数生效。

MYNT® EYE SDK 工具

分析IMU数据

SDK 提供了 IMU 数据分析工具 imu_analytics.py. 工具的详细信息见 tools/README.md

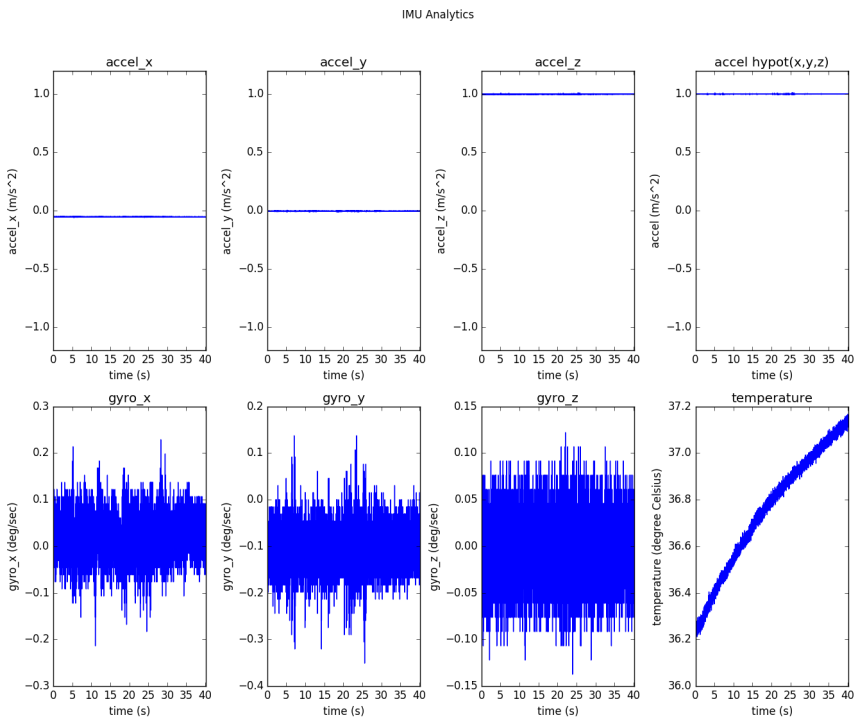
Linux 系统运行命令:

```
$ python tools/analytics/imu_analytics.py -i dataset -c tools/config/mynteye/mynteye_config.yaml -al=-1.2,1.2 -gl= -gdu=d -gsu=d -kl=
```

Linux 系统上的结果参考:

```
$ python tools/analytics/imu_analytics.py -i dataset -c tools/config/mynteye/mynteye_config.yaml -al=-1.2,1.2 -gl= -gdu=d -gsu=d -kl=
imu analytics ...
  input: dataset
  outdir: dataset
  gyro_limits: None
  accel_limits: [(-1.2, 1.2), (-1.2, 1.2), (-1.2, 1.2), (-1.2, 1.2)]
  time_unit: None
  time_limits: None
  auto: False
  gyro_show_unit: d
  gyro_data_unit: d
  temp_limits: None
open dataset ...
  imu: 20040, temp: 20040
  timebeg: 4.384450, timeend: 44.615550, duration: 40.231100
save figure to:
  dataset/imu_analytics.png
imu analytics done
```

分析结果图保存在 dataset 目录中. 如下:



\includegraphics[width=1\textwidth]{imu_analytics.png} \endlatexonly

另外，可以使用 -h 参数查看工具详细参数选项.

```
$ python tools/analytics/imu_analytics.py -h
```

分析时间戳

SDK 提供了时间戳分析工具 stamp_analytics.py. 工具的详细信息见 tools/README.

Linux 系统运行命令:

```
$ python tools/analytics/stamp_analytics.py -i dataset -c tools/config/mynteye/mynteye_config.yaml
```

Linux 系统上的结果参考:

```
$ python tools/analytics/stamp_analytics.py -i dataset -c tools/config/mynteye/mynteye_config.yaml
stamp analytics ...
  input: dataset
  outdir: dataset
open dataset ...
save to binary files ...
  binimg: dataset/stamp_analytics_img.bin
  binimu: dataset/stamp_analytics_imu.bin
  img: 1007, imu: 20040

rate (Hz)
  img: 25, imu: 500
sample period (s)
  img: 0.04, imu: 0.002

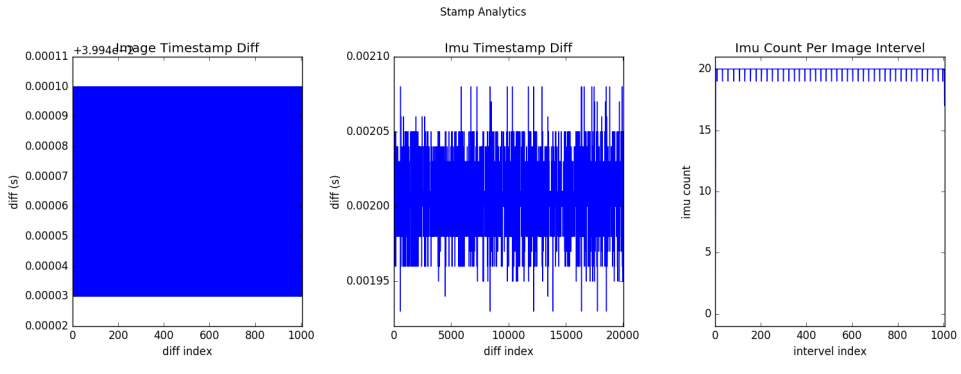
diff count
  imgs: 1007, imus: 20040
  imgs_t_diff: 1006, imus_t_diff: 20039

diff where (factor=0.1)
  imgs where diff > 0.04*1.1 (0)
  imgs where diff < 0.04*0.9 (0)
  imus where diff > 0.002*1.1 (0)
  imus where diff < 0.002*0.9 (0)

image timestamp duplicates: 0

save figure to:
  dataset/stamp_analytics.png
stamp analytics done
```

分析结果图保存在 dataset 目录中. 如下:



\includegraphics[width=1\textwidth]{stamp_analytics.png} \endlatexonly

另外，可以使用 -h 参数查看工具详细参数选项.

```
$ python tools/analytics/stamp_analytics.py -h
```

> 技巧
>
> 录制数据集时``dataset.cc`` 里已经注释存储图像 cv::imwrite() 。因为此些操作都比较耗时，可能会导致丢弃图像。换句话说就是消费赶不上生产，所以丢弃了部分图像。 record.cc 里用的 GetStreamDatas() 仅缓存最新的 4 张图像。

录制数据集

SDK 提供了录制数据集的工具 record. 工具的详细信息见 tools/README.md

Linux 系统运行命令:

```
./tools/_output/bin/dataset/record
```

Windows 系统运行命令:

```
.\tools\_output\bin\dataset\record.bat
```

Linux 系统上的结果参考:

```
$ ./tools/_output/bin/dataset/record
Saved 1007 imgs, 20040 imus to ./dataset
I0513 21:29:38.608772 11487 record.cc:118] Time beg: 2018-05-13 21:28:58.255395, end: 2018-05-13 21:29:38.578696, cost: 40323.3ms
I0513 21:29:38.608853 11487 record.cc:121] Img count: 1007, fps: 24.9732
I0513 21:29:38.608873 11487 record.cc:123] Imu count: 20040, hz: 496.983
```

结果默认保存在 <workdir>/dataset 中. 您也可以使用参数指定自定义目录存放结果.

录制结果目录详情:

```
<workdir>/
 └──dataset/
    ├──left/
    │   ├──stream.txt  # Image infomation
    │   ├──000000.png  # Image, index 0
    │   └──...
    ├──right/
    │   ├──stream.txt  # Image information
    │   ├──000000.png  # Image, index 0
    │   └──...
    └──motion.txt  # IMU information
```

保存设备信息和参数

SDK 提供了保存信息和参数的工具 save_all_infos 。

参考运行命令：

```
./tools/_output/bin/writer/save_all_infos
```

```
# Windows
.\tools\_output\bin\writer\save_all_infos.bat
```

参考运行结果，于 Linux 上：

```
I/eSPDI_API: eSPDI: EtronDI_Init
Device descriptors:
  name: MYNT-EYE-D1000
  serial_number: 203837533548500F002F0028
  firmware_version: 1.0
  hardware_version: 2.0
  spec_version: 1.0
  lens_type: 0000
  imu_type: 0000
  nominal_baseline: 120
```

默认会保存进 <workdir>/config 目录。你也可以加参数，指定保存到其他目录。

保存内容如下：

```
<workdir>/
 └──config/
    └──SN0610243700090720/
       ├──device.info
       └──imu.params
```

完整代码样例 save_all_infos.cc 。

写入IMU标定参数

SDK提供了写入IMU标定参数的工具 imu_params_writer 。

有关如何获取，请阅读 获取IMU标定参数 。

参考运行命令:

```
./tools/_output/bin/writer/imu_params_writer tools/writer/config/imu.params
```

```
# Windows
.\tools\_output\bin\writer\imu_params_writer.bat tools\writer\config\imu.params
```

其中，tools/writer/config/imu.params 是参数文件路径。如果你自己标定了参数，可以编辑此文件，然后执行上述命令写入设备。

> **警告**
>
> 请不要随意覆写参数。另外 save_all_infos 工具可帮你备份参数。

完整代码样例 imu_params_writer.cc 。

工程样例

辅助芯片升级

获取升级固件

最新固件： mynteye-d-hid-firmware-1.2.bin Google Drive, 百度网盘

编译 SDK 工具

```
cd <sdk>  #<sdk>为sdk所在路径
make tools
```

升级固件

```
./tools/_output/bin/writer/device_hid_update <firmware-file-path>
```

升级相机固件

> **注解**
>
> 此工具不支持内测版设备升级

获取固件

Latest firmware: SICI-B12-B0135P-016-005-ISO_Plugout2M(Interleave).bin Google Drive, Baidu Pan

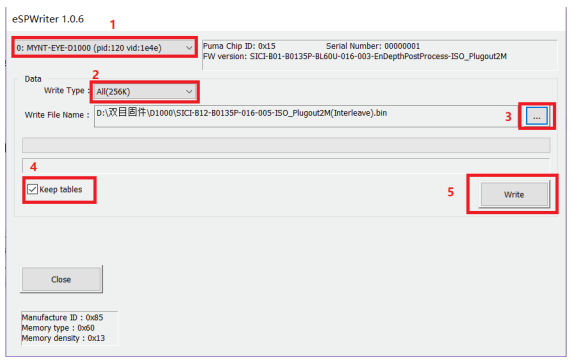
获取升级工具

Latest tool: eSPWriter_1.0.6.zip Google Drive, Baidu Pan

升级固件

> **注解**
>
> 请严格按照步骤升级固件.(否则可能会丢失相机标定参数)
>
> 1, 选择相机设备.
>
> 2, 选择数据类型(256KB).
>
> 3, 选择相机固件.
>
> 4, 选择 Keep tables (保留相机标定参数).
>
> 5, 点击 Write.

参考图示使用工具:



工程样例

Visual Studio 2017 如何使用 SDK

本教程将使用 Visual Studio 2017 创建一个项目来使用 SDK 。

你可以在 <sdk>/platforms/projects/vs2017 目录下找到工程样例。

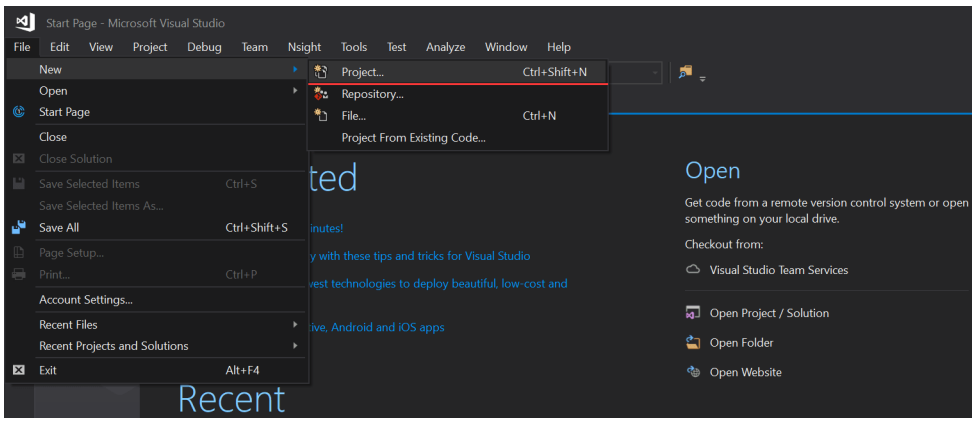
准备

- Windows: 安装 SDK 的 exe 包

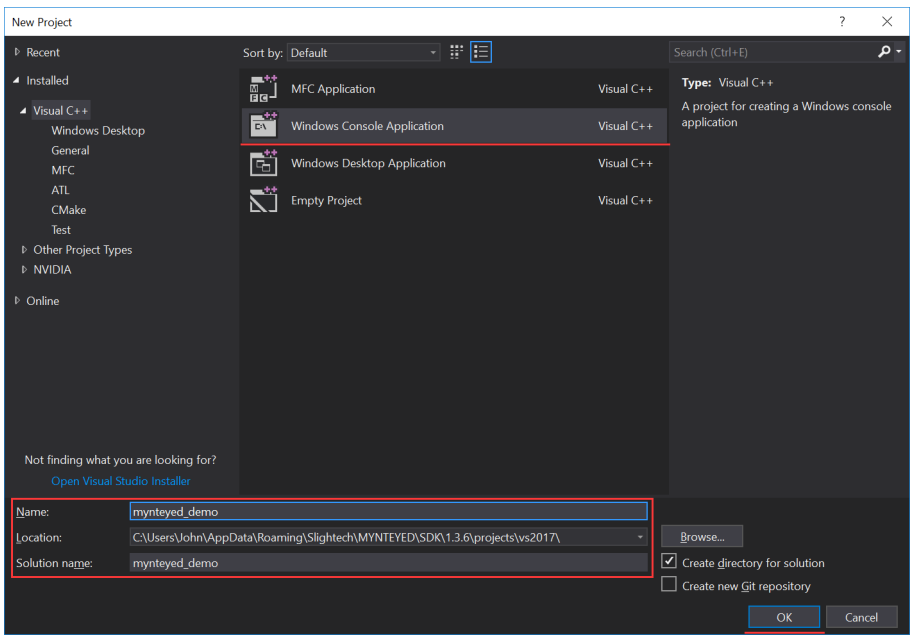
创建项目

打开 Visual Studio 2017 ，然后 File > New > Project，

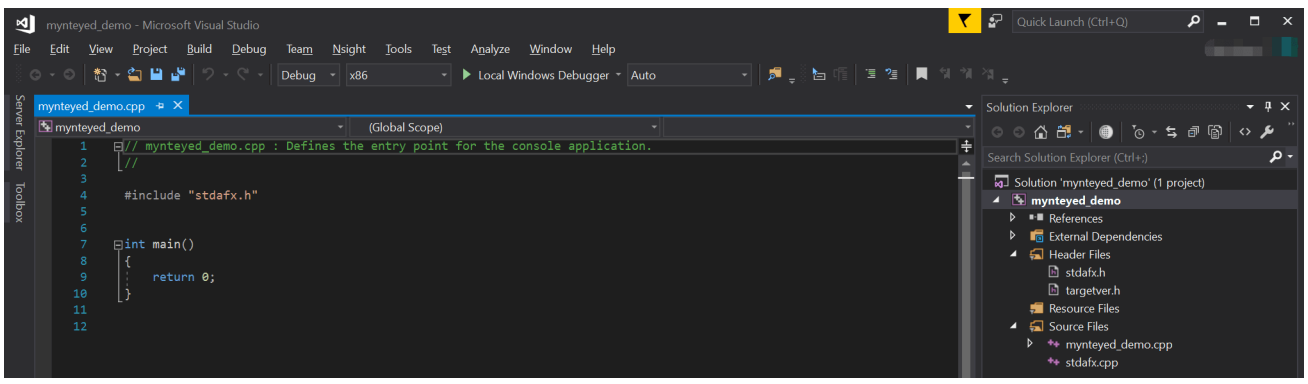
工程样例



选择 “Windows Console Application”，设置项目位置和名字，点击 “OK”，

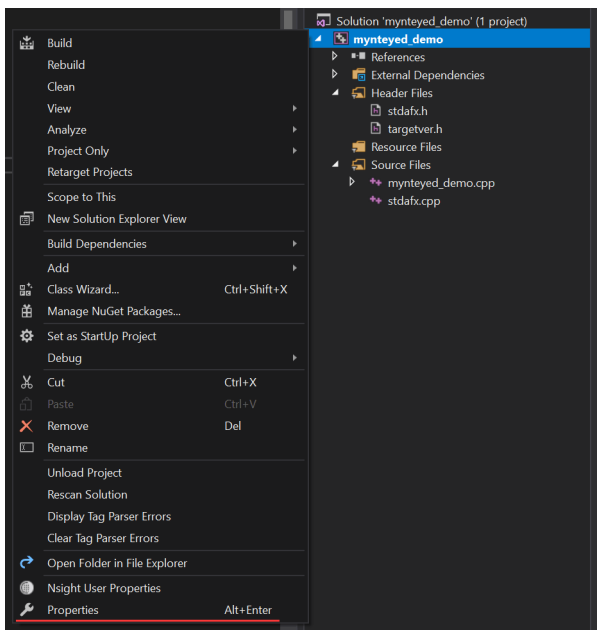


最后，你可以看到一个新的项目被创建，



配置项目

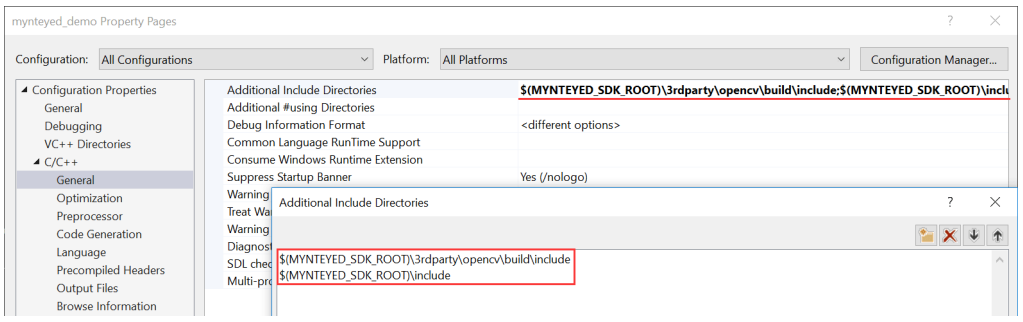
右键点击该项目， 打开 “Properties” 窗口，



将 “Configuration” 更改为 “All Configurations”，然后添加以下路径到 “Additional Include Directories”，

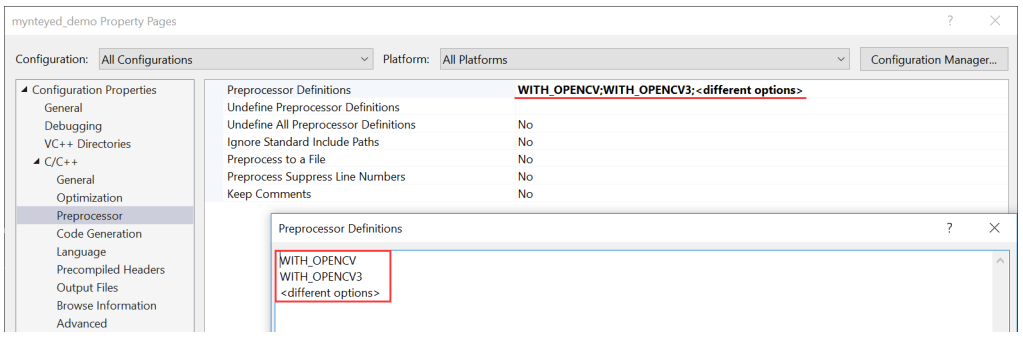
```
$(MYNTEYED_SDK_ROOT)\include
$(MYNTEYED_SDK_ROOT)\3rdparty\opencv\build\include
```

工程样例



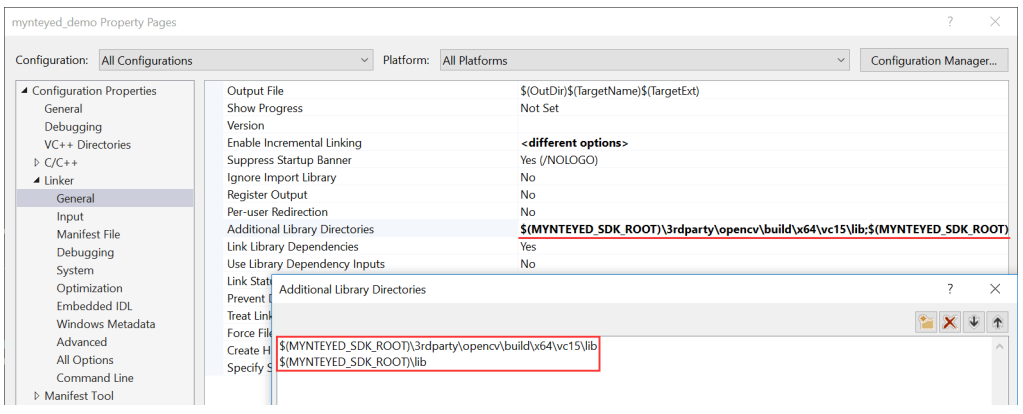
添加以下定义到 “Preprocessor Definitions”，

```
WITH_OPENCV
WITH_OPENCV3
```



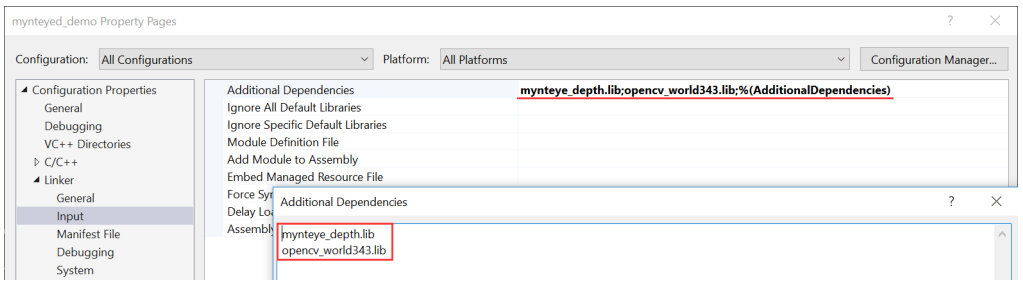
添加以下路径到 “Additional Library Directories” ，

```
$(MYNTEYED_SDK_ROOT)\lib
$(MYNTEYED_SDK_ROOT)\3rdparty\opencv\build\x64\vc15\lib
```



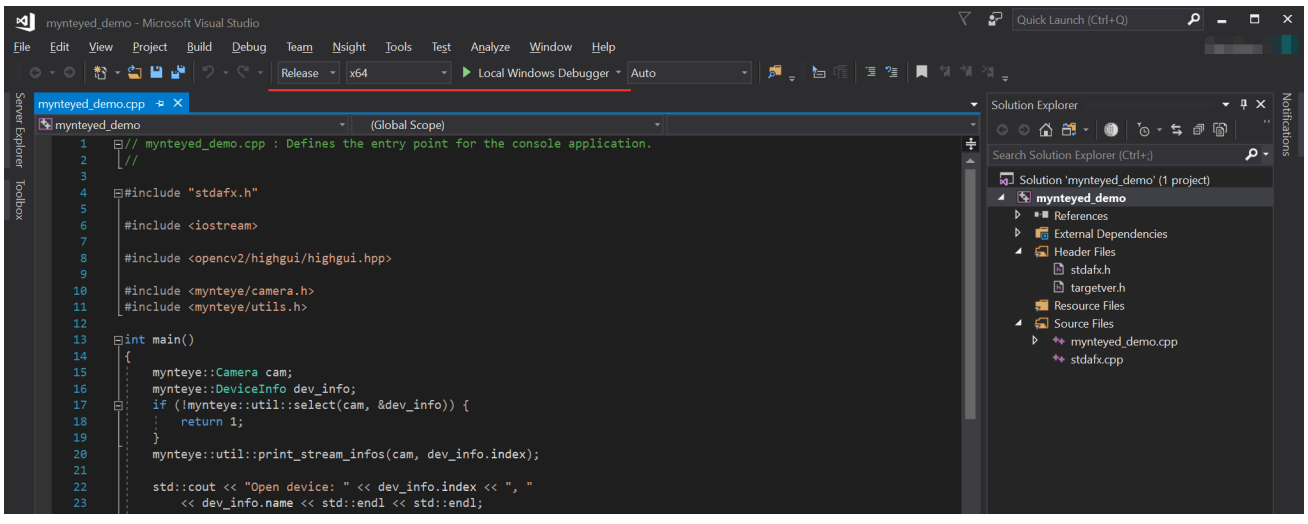
添加以下库到 “Additional Dependencies” ，

```
mynteye_depth.lib
opencv_world343.lib
```



使用SDK

添加头文件和使用 API ，



选择 “Release x64” 来运行项目。

Qt Creator 如何使用 SDK

该教程将会使用 Qt creator 创建 Qt 项目来运行 SDK 。

工程样例

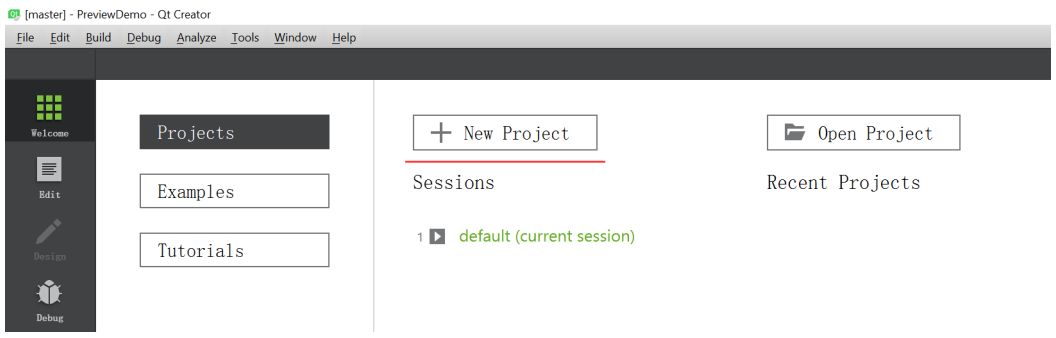
你可以在 <sdk>/platforms/projects/qtcreator 目录下找到工程样例。

准备

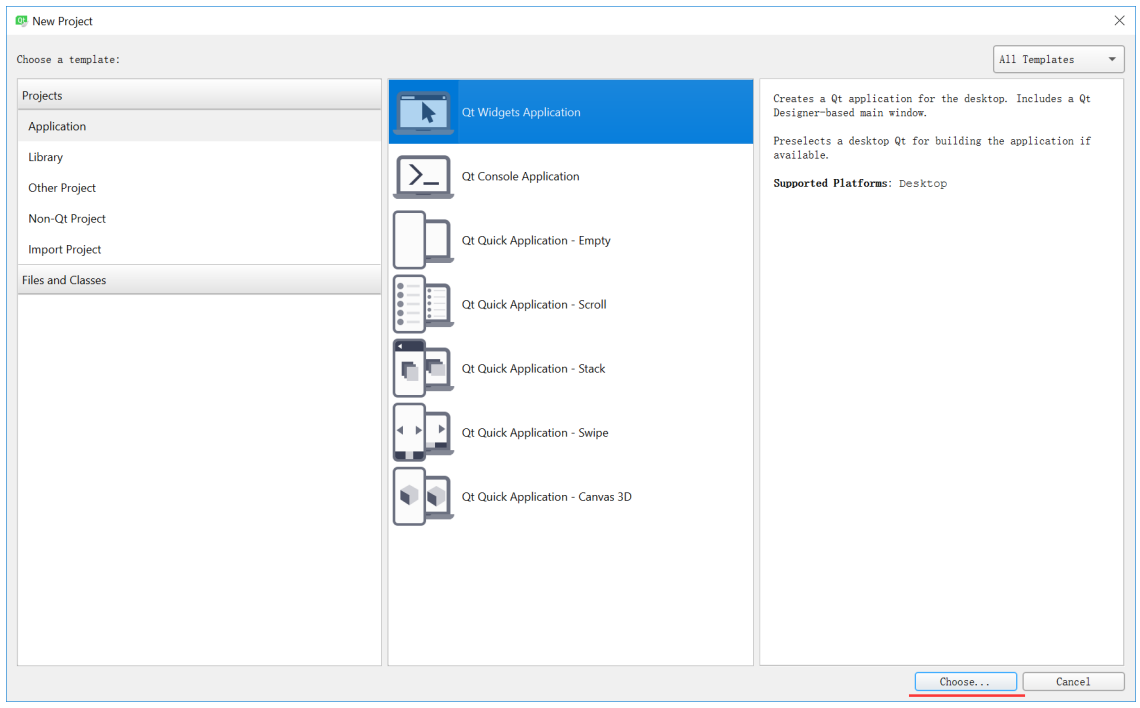
- Windows: 安装 SDK 的 exe 包
- Linux: 使用源代码编译和 make install

创建项目

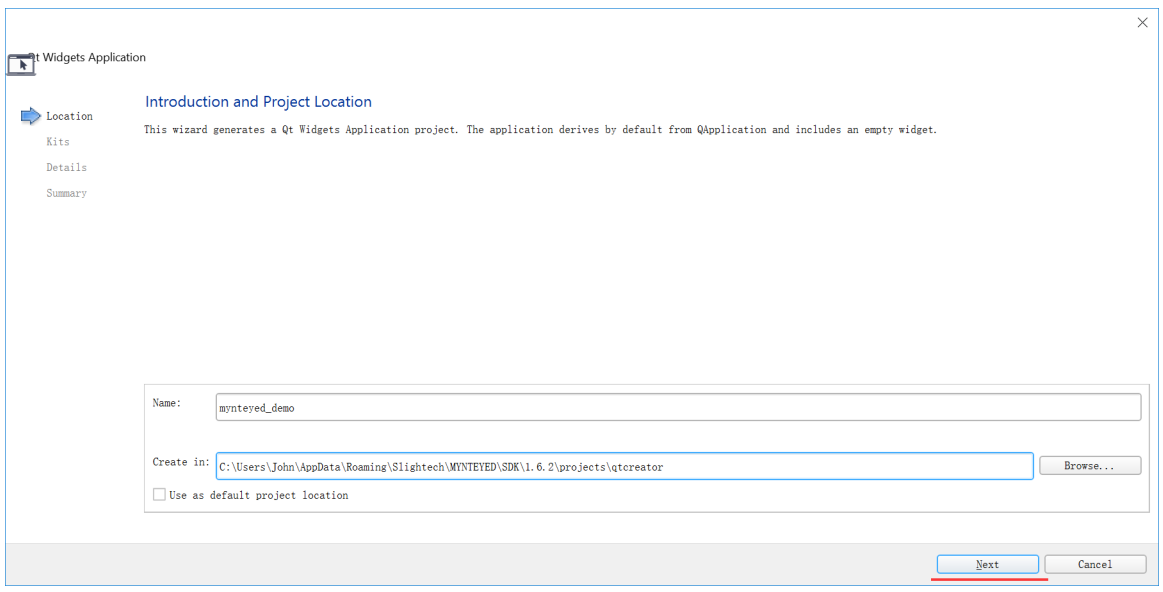
打开 Qt Creator ，然后 New Project，



选择 Qt Widgets Application ，

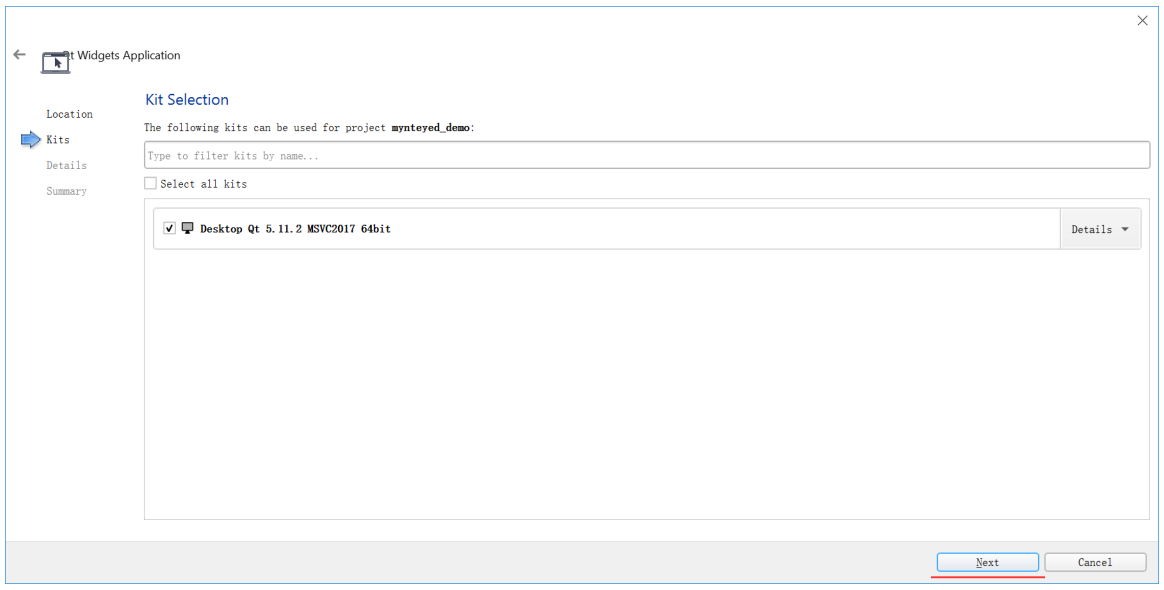


设置项目位置和名字，

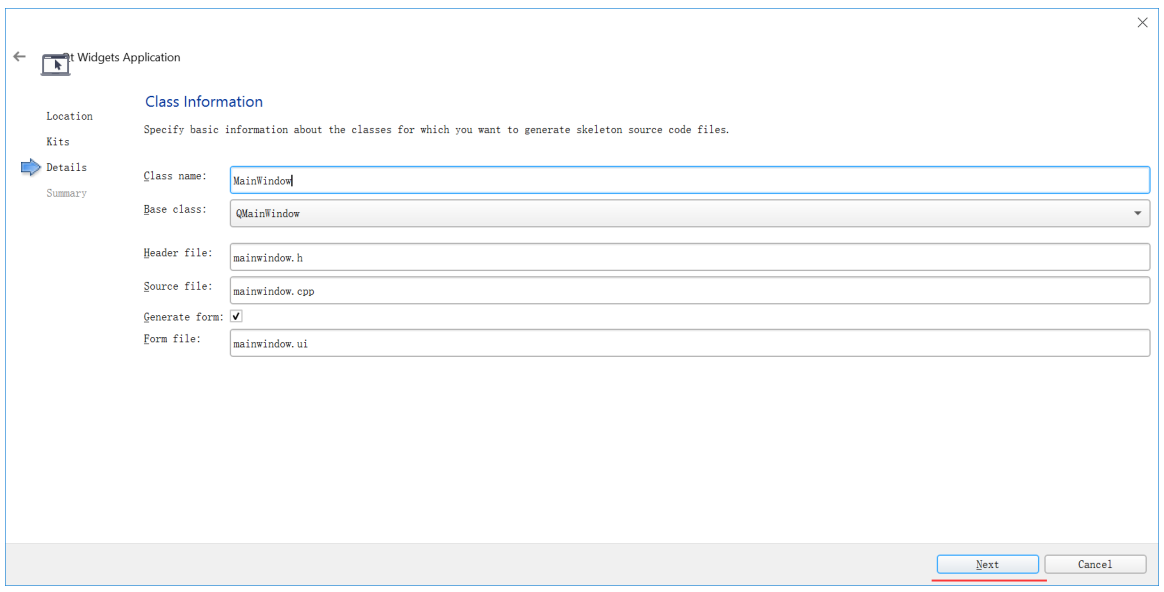


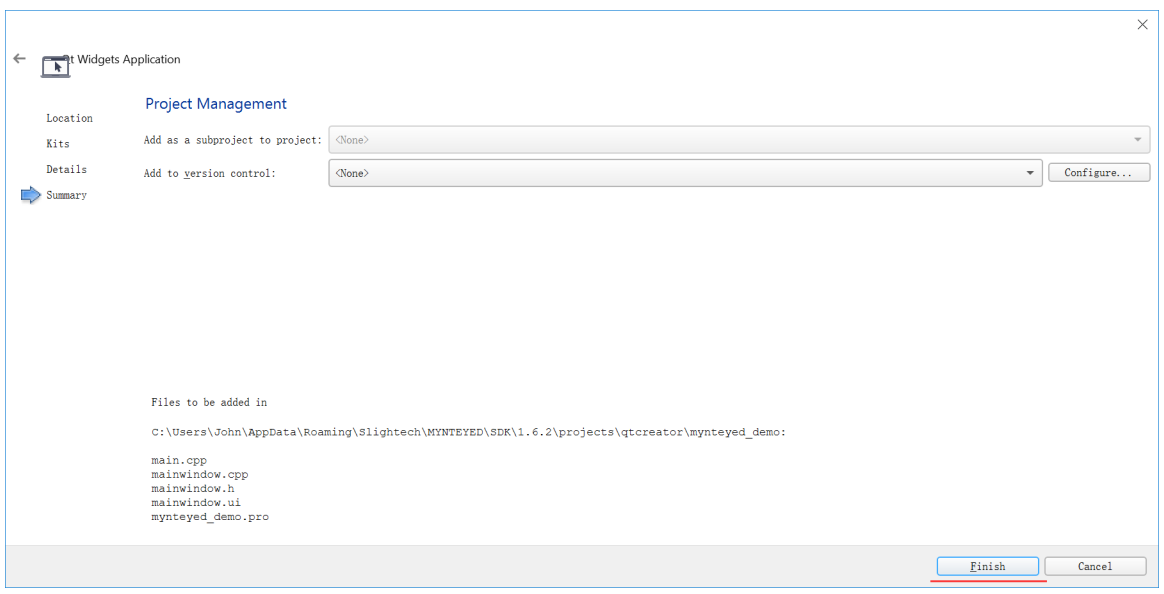
选择 build kits ，

工程样例

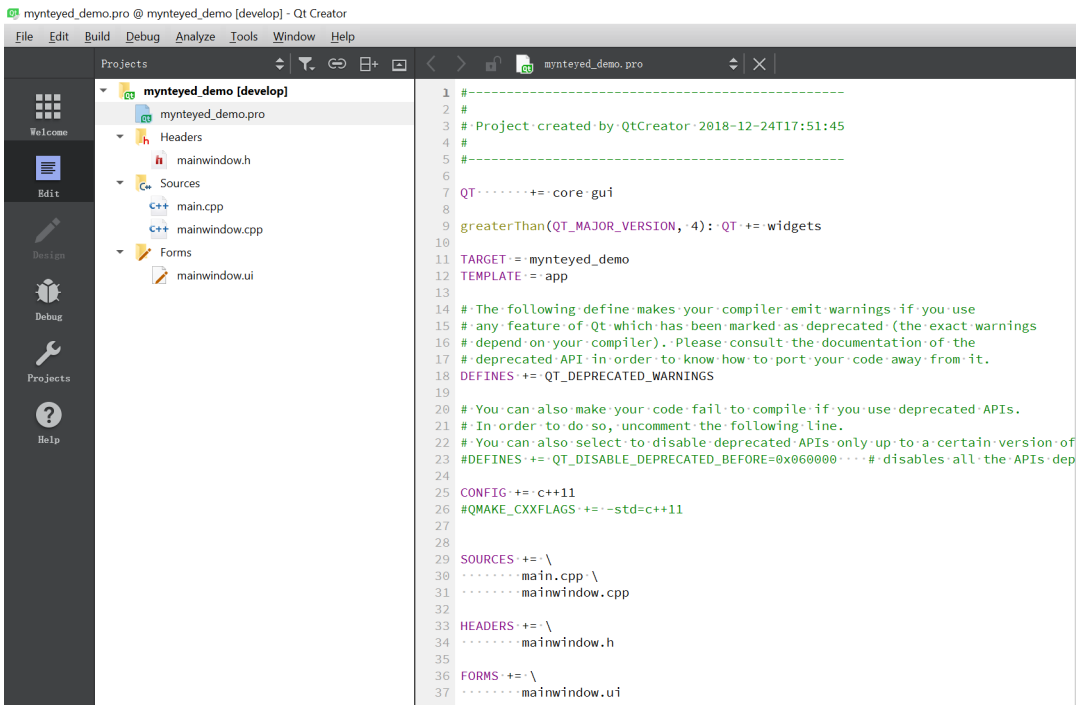


然后他将会生成框架源文件，





最后，你将会看到这样的新项目工程，



配置项目

添加 INCLUDEPATH 和 LIBS 到 mynteyed_demo.pro 。

工程样例

```
win32 {
    SDK_ROOT = "$$(MYNTEYED_SDK_ROOT)"
    isEmpty(SDK_ROOT) {
        error( "MYNTEYED_SDK_ROOT not found, please install SDK firstly" )
    }
    message("SDK_ROOT: $$SDK_ROOT")

    INCLUDEPATH += "$$SDK_ROOT/include"
    LIBS += "$$SDK_ROOT/lib/mynteye_depth.lib"
}

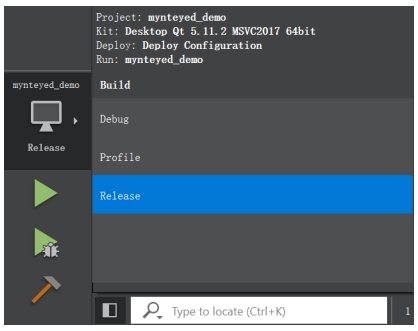
unix {
    INCLUDEPATH += /usr/local/include
    LIBS += -L/usr/local/lib -lmynteye_depth
}
```

使用SDK

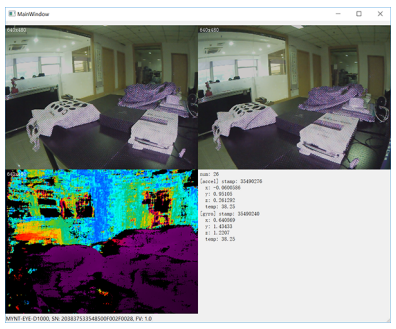
可以参考工程样例添加头文件和使用 API 。

Windows

选择 “Release” 来运行项目。

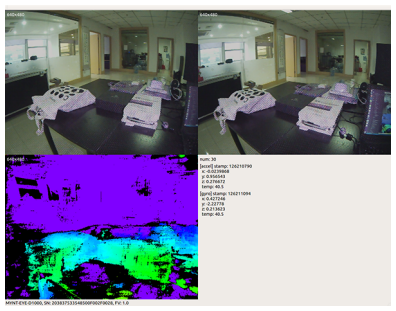


然后你将看到主窗口，



Linux

运行项目，你将看到主窗口，



CMake 如何使用 SDK

本教程将使用 CMake 创建一个项目来使用 SDK 。

你可以在 <sdk>/platforms/projects/cmake 目录下找到工程样例。

准备

- Windows: 安装 SDK 的 exe 包
- Linux: 使用源代码编译和 make install

创建项目

添加 CMakeLists.txt 和 mynteyed_demo.cc 文件，

```
cmake_minimum_required(VERSION 3.0)

project(mynteyed_demo VERSION 1.0.0 LANGUAGES C CXX)

# flags

set(CMAKE_C_FLAGS "${CMAKE_C_FLAGS} -Wall -O3")
set(CMAKE_CXX_FLAGS "${CMAKE_CXX_FLAGS} -Wall -O3")
```

工程样例

```
set(CMAKE_C_FLAGS "${CMAKE_C_FLAGS} -std=c++11 -march=native")
set(CMAKE_CXX_FLAGS "${CMAKE_CXX_FLAGS} -std=c++11 -march=native")

## mynteyed_demo

add_executable(mynteyed_demo mynteyed_demo.cc)
```

配置项目

增加 mynteyed 和 OpenCV 到 CMakeLists.txt ，

```
# packages

if(MSVC)
  set(SDK_ROOT "$ENV{MYNTEYED_SDK_ROOT}")
  if(SDK_ROOT)
    message(STATUS "MYNTEYED_SDK_ROOT: ${SDK_ROOT}")
    list(APPEND CMAKE_PREFIX_PATH
      "${SDK_ROOT}/lib/cmake"
      "${SDK_ROOT}/3rdparty/opencv/build"
    )
  else()
    message(FATAL_ERROR "MYNTEYED_SDK_ROOT not found, please install SDK firstly")
  endif()
endif()

## mynteyed

find_package(mynteyed REQUIRED)
message(STATUS "Found mynteye: ${mynteyed_VERSION}")

# When SDK build with OpenCV, we can add WITH_OPENCV macro to enable some
# features depending on OpenCV, such as ToMat().
if(mynteyed_WITH_OPENCV)
  add_definitions(-DWITH_OPENCV)
endif()

## OpenCV

# Set where to find OpenCV
#set(OpenCV_DIR "/usr/share/OpenCV")

# When SDK build with OpenCV, we must find the same version here.
find_package(OpenCV REQUIRED)
message(STATUS "Found OpenCV: ${OpenCV_VERSION}")
```

将 include_directories 和 target_link_libraries 添加到 mynteyed_demo 目标，

```
# targets

include_directories(
  ${OpenCV_INCLUDE_DIRS}
)

## mynteyed_demo

add_executable(mynteyed_demo mynteyed_demo.cc)
target_link_libraries(mynteyed_demo mynteye_depth ${OpenCV_LIBS})
```

使用SDK

可以参考工程样例添加头文件和使用 API 。

Windows

可以参考 Windows SDK 用户指南，安装编译工具。

然后打开 “x64 Native Tools Command Prompt for VS 2017” 命令行来编译和运行，

```
mkdir _build
cd _build

cmake -G "Visual Studio 15 2017 Win64" ..

msbuild.exe ALL_BUILD.vcxproj /property:Configuration=Release

.\Release\mynteyed_demo.exe
```

Linux

打开命令行来编译和运行，

```
mkdir _build
cd _build/

cmake ..

make

./mynteyed_demo
```

开源项目支持

VINS-Mono 如何整合

在 MYNT® EYE 上运行 VINS-Mono，请依照这些步骤：

1. 下载 MYNT-EYE-D-SDK 及 ROS 安装。
2. 按照一般步骤安装 VINS-Mono 。
3. 在 这里 更新 distortion_parameters 和 projection_parameters 参数。
4. 运行 mynteye_wrapper_d 和 VINS-Mono 。

快捷安装 ROS Kinetic (若已安装，请忽略)

```
cd ~
wget https://raw.githubusercontent.com/oroca/oroca-ros-pkg/master/ros_install.sh && \
chmod 755 ./ros_install.sh && bash ./ros_install.sh catkin_ws kinetic
```

安装 MYNT-EYE-VINS-Sample

```
mkdir -p ~/catkin_ws/src
cd ~/catkin_ws/src
git clone -b mynteye https://github.com/slightech/MYNT-EYE-VINS-Sample.git
cd ..
catkin_make
source devel/setup.bash
echo "source ~/catkin_ws/devel/setup.bash" >> ~/.bashrc
source ~/.bashrc
```

获取图像校准参数

使用 MYNT® EYE 的左目摄像头和 IMU 。通过 MYNT-EYE-D-SDK API的 GetIntrinsics() 函数和 GetExtrinsics() 函数，可以获得当前工作设备的图像校准参数：

```
cd MYNT-EYE-D-SDK
./samples/_output/bin/get_img_params
```

这时，可以获得针孔模型下的 distortion_parameters 和 projection_parameters 参数，然后在 这里 更新。

在 MYNT® EYE 上运行 VINS-Mono

1.运行mynteye节点

```
cd (local path of MYNT-EYE-D-SDK)
source ./wrappers/ros/devel/setup.bash
roslaunch mynteye_wrapper_d mynteye.launch
```

2.打开另一个命令行运行vins

```
cd ~/catkin_ws
roslaunch vins_estimator mynteye_d.launch
```

ORB_SLAM2 如何整合

在 MYNT® EYE 上运行 ORB_SLAM2 ，请依照这些步骤：

1. 下载 MYNT-EYE-D-SDK 及 ROS 安装。
2. 按照一般步骤安装 ORB_SLAM2 。
3. 更新 distortion_parameters 和 projection_parameters 参数到 <ORB_SLAM2>/config/mynteye_d.yaml。
4. 在 MYNT® EYE 上运行例子。

ROS 下创建单目和双目节点

- 添加 Examples/ROS/ORB_SLAM2 路径到环境变量 ROS_PACKAGE_PATH 。打开 .bashrc 文件，在最后添加下面命令行。 PATH 为当前 ORB_SLAM2 存放路径:

```
export ROS_PACKAGE_PATH=${ROS_PACKAGE_PATH}:PATH/ORB_SLAM2/Examples/ROS
```

- 运行脚本 build_ros.sh ：

```
chmod +x build_ros.sh
./build_ros.sh
```

Stereo_ROS 例子

- 按照 OKVIS 如何整合 中的``获取相机校准参数`` 得到 distortion_parameters 和 projection_parameters 参数，并在 <ORB_SLAM2>/config/mynteye_d_stereo.yaml 中更新参数。
- 运行 ORB_SLAM2 Stereo_ROS 例子

1.运行mynteye节点

```
cd [path of mynteye-d-sdk]
make ros
source ./wrappers/ros/devel/setup.bash
roslaunch mynteye_wrapper_d mynteye.launch
```

2.打开另一个命令行运行ORB_SLAM2

```
rosrun ORB_SLAM2 mynteye_d_stereo ./Vocabulary/ORBvoc.txt ./config/mynteye_d_stereo.yaml true /mynteye/left/image_mono /mynteye/right/image_mono
```

OKVIS 如何整合

在 MYNT® EYE 上运行 OKVIS ，请依照这些步骤：

1. 下载 MYNT-EYE-D-SDK 并 ROS 安装。
2. 安装依赖，按照原始 OKVIS 步骤安装 MYNT-EYE-OKVIS-Sample 。
3. 更新相机参数到 <OKVIS>/config/config_mynteye_d.yaml 。
4. 在 MYNT® EYE 上运行 OKVIS 。

安装 MYNT® EYE OKVIS

首先安装原始 OKVIS 及依赖：

```
sudo apt-get install libgoogle-glog-dev

git clone -b mynteye https://github.com/slightech/MYNT-EYE-OKVIS-Sample.git
cd MYNT-EYE-OKVIS-Sample/
mkdir build && cd build
cmake ..
make
```

获取相机校准参数

通过 MYNT-EYE-D-SDK API 的 GetIntrinsics() 函数和 GetExtrinsics() 函数，可以获得当前工作设备的图像校准参数：

```
cd MYNT-EYE-D-SDK
./samples/_output/bin/get_img_params
```

这时，可以获得针孔模型下的 distortion_parameters 和 projection_parameters 参数，然后在 这里 更新。

```
distortion_coefficients: [coeffs]   # only first four parameters of coeffs need to be filled
focal_length: [fx, fy]
principal_point: [cx, cy]
distortion_type: radialtangential
```

运行 MYNT® EYE OKVIS

运行``mynteye_wrapper_d``

```
cd MYNT-EYE-D-SDK
source wrappers/ros/devel/setup.bash
roslaunch mynteye_wrapper_d mynteye.launch
```

运行 MYNT-EYE-OKVIS-Sample，打开一个新的窗口并运行以下步骤：

```
cd MYNT-EYE-OKVIS-Sample/build
source devel/setup.bash
roslaunch okvis_ros mynteye_d.launch
```

使用 rviz 来显示：

```
cd ~/catkin_okvis/src/MYNT-EYE-OKVIS-Sample/config
rosrun rviz rviz -d rviz.rviz
```

VIORB 如何整合

在 MYNT® EYE 上运行 VIORB ，请依照这些步骤：

开源项目支持

1. 下载 MYNT-EYE-D-SDK 及 ROS 安装。
2. 按照一般步骤安装 VIORB 。
3. 更新相机参数到 <VIO>/config/mynteye_d.yaml。
4. 运行 mynteye_wrapper_d 和 VIORB 。

安装 MYNT-EYE-VIORB-Sample.

```
git clone -b mynteye https://github.com/slightech/MYNT-EYE-VIORB-Sample.git
cd MYNT-EYE-VIORB-Sample
```

添加 Examples/ROS/ORB_VIO 路径到环境变量 ROS_PACKAGE_PATH 。打开 .bashrc 文件，在最后添加下面命令行。 PATH 为当前 MYNT-EYE-VIORB-Sample. 存放路径:

```
export ROS_PACKAGE_PATH=${ROS_PACKAGE_PATH}:PATH/Examples/ROS/ORB_VIO
```

执行:

```
cd MYNT-EYE-VIORB-Sample
./build.sh
```

获取相机校准参数

使用 MYNT® EYE 的左目摄像头和 IMU 。通过 MYNT-EYE-D-SDK API 的 GetIntrinsics() 函数和 GetExtrinsics() 函数，可以获得当前工作设备的图像校准参数:

```
cd MYNT-EYE-D-SDK
./samples/_output/bin/get_img_params
```

这时，可以获得针孔模型下的 distortion_parameters 和 projection_parameters 参数，然后在 <MYNT-EYE-VIORB-Sample>/config/mynteye_d.yaml 中更新。

运行 VIORB 和 mynteye_wrapper_d

1.运行mynteye节点

```
roslaunch mynteye_wrapper_d mynteye.launch
```

2.打开另一个命令行运行viorb

```
roslaunch ORB_VIO testmynteye_d.launch
```

最后，pyplotscripts 下的脚本会将结果可视化。

VINS-Fusion 如何整合

在 MYNT® EYE 上运行 VINS-Fusion，请依照这些步骤:

1. 下载 MYNT-EYE-D-SDK 及 ROS 安装。
2. 按照一般步骤安装 VINS-Fusion 。
3. 运行 mynteye_wrapper_d 和 VINS-Fusion 。

准备步骤

1. 安装 Ubuntu 64位 16.04/18.04. ROS Kinetic/Melodic(如果已经安装ROS可以跳过). ROS安装步骤
2. 安装 Ceres

安装 MYNT-EYE-VINS-FUSION-Samples

```
mkdir -p ~/catkin_ws/src
cd ~/catkin_ws/src
git clone -b mynteye https://github.com/slightech/MYNT-EYE-VINS-FUSION-Samples.git
cd ..
catkin_make
source ~/catkin_ws/devel/setup.bash
```

(如果安装失败，请尝试换一台系统干净的电脑或者重新安装系统与ROS)

在 MYNT® EYE 上运行 VINS-FUSION

1.运行mynteye节点

```
cd (local path of MYNT-EYE-D-SDK)
source ./wrappers/ros/devel/setup.bash
roslaunch mynteye_wrapper_d mynteye.launch
```

2.打开另一个命令行运行vins

```
cd ~/catkin_ws
roslaunch vins mynteye-d-mono-imu.launch  # mono+imu fusion
# roslaunch vins mynteye-d-stereo.launch  # Stereo fusion / Stereo+imu fusion
```

API 参考

Camera

class Camera

Public Functions

std::vector<DeviceInfo> GetDeviceInfos () const
  Get all device infos.
void GetDeviceInfos (std::vector<DeviceInfo> *dev_infos) const
  Get all device infos.
void GetStreamInfos (const std::int32_t &dev_index, std::vector<StreamInfo> *color_infos, std::vector<StreamInfo> *depth_infos) const
  Get all stream infos.
ErrorCode Open ()
  Open camera.
ErrorCode Open (const OpenParams &params)
  Open camera with params.
bool IsOpened () const
  Whethor camera is opened or not.
std::shared_ptr<device::Descriptors> GetDescriptors () const
  Get all device descriptors.
std::string GetDescriptor (const Descriptor &desc) const
  Get one device descriptor.
StreamIntrinsics GetStreamIntrinsics (const StreamMode &stream_mode) const
  Get the intrinsics of camera.
StreamIntrinsics GetStreamIntrinsics (const StreamMode &stream_mode, bool *ok) const
  Get the intrinsics of camera.
StreamExtrinsics GetStreamExtrinsics (const StreamMode &stream_mode) const
  Get the extrinsics of camera.
StreamExtrinsics GetStreamExtrinsics (const StreamMode &stream_mode, bool *ok) const
  Get the extrinsics of camera.
bool WriteCameraCalibrationBinFile (const std::string &filename)
  Write camera calibration bin file.
MotionIntrinsics GetMotionIntrinsics () const
  Get the intrinsics of motion.
MotionIntrinsics GetMotionIntrinsics (bool *ok) const
  Get the intrinsics of motion.
MotionExtrinsics GetMotionExtrinsics () const
  Get the extrinsics from left to motion.
MotionExtrinsics GetMotionExtrinsics (bool *ok) const
  Get the extrinsics from left to motion.
bool IsWriteDeviceSupported () const
  Whethor write device supported or not.
bool WriteDeviceFlash (device::Descriptors *desc, device::ImuParams *imu_params, Version *spec_version = nullptr)
  Write device flash.
void EnableProcessMode (const ProcessMode &mode)
  Enable process mode, e.g.
  imu assembly, temp_drift
void EnableProcessMode (const std::int32_t &mode)
  Enable process mode, e.g.
  imu assembly, temp_drift
bool IsImageInfoSupported () const
  Whethor image info supported or not.
void EnableImageInfo (bool sync)
  Enable image infos.
  If sync is false, indicates only can get infos from callback. If sync is true, indicates can get infos from callback or access it from StreamData.
void DisableImageInfo ()
  Disable image info.
bool IsImageInfoEnabled () const
  Whethor image info enabled or not.
bool IsImageInfoSynced () const
  Whethor image info synced or not.
bool IsStreamDataEnabled (const ImageType &type) const
  Whethor stream data of certain image type enabled or not.
bool HasStreamDataEnabled () const
  Has any stream data enabled.
StreamData GetStreamData (const ImageType &type)
  Get latest stream data.
std::vector<StreamData> GetStreamDatas (const ImageType &type)
  Get cached stream datas.
bool IsMotionDatasSupported () const
  Whethor motion datas supported or not.
void EnableMotionDatas (std::size_t max_size = std::numeric_limits<std::size_t>::max())
  Enable motion datas.
  If max_size <= 0, indicates only can get datas from callback. If max_size > 0, indicates can get datas from callback or using GetMotionDatas().
  Note: if max_size > 0, the motion datas will be cached until you call GetMotionDatas().
void DisableMotionDatas ()

Disable motion datas.
bool IsMotionDatasEnabled () const
Whethor motion datas enabled or not.
std::vector<MotionData> GetMotionDatas ()
Get cached motion datas.
Besides, you can also get them from callback
void SetImgInfoCallback (img_info_callback_t callback, bool async = true)
Set image info callback.
void SetStreamCallback (const ImageType &type, stream_callback_t callback, bool async = true)
Set stream data callback.
void SetMotionCallback (motion_callback_t callback, bool async = true)
Set motion data callback.
void Close ()
Close the camera.
bool HidFirmwareUpdate (const char *filepath)
Update hid device firmware.
void SetExposureTime (const float &value)
Set exposure time [1ms - 2000ms] value exposure time value.
void GetExposureTime (float &value)
Get exposure time value return exposure time value.
void SetGlobalGain (const float &value)
Set global gain [1 - 16] value global gain value.
void GetGlobalGain (float &value)
Get global gain value return global gain value.
void SetIRIntensity (const std::uint16_t &value)
set infrared(IR) intensity [0, 10] default 4
bool AutoExposureControl (bool enable)
Auto-exposure enabled or not default enabled.
bool AutoWhiteBalanceControl (bool enable)
Auto-white-balance enabled or not default enabled.

Device

DeviceInfo

struct DeviceInfo
Device information.

Public Members

std::int32_t index
The device index.
std::string name
The device name.
std::uint16_t type
The device type.
std::uint16_t pid
The product id.
std::uint16_t vid
The vendor id.
std::uint16_t chip_id
The chip id.
std::string fw_version
The firmware version.

Image

class Image
Subclassed by mynteyed::ImageColor, mynteyed::ImageDepth

OpenParams

struct OpenParams
Device open parameters.

Public Functions

OpenParams ()
Constructor.
~OpenParams ()
Destructor.

Public Members

std::int32_t dev_index
Device index.
std::int32_t framerate
Framerate, range [0,60], [0,30](STREAM_2560x720), default 10.
DeviceMode dev_mode
Device mode, default DEVICE_ALL.
DEVICE_COLOR: IMAGE_LEFT_COLOR y IMAGE_RIGHT_COLOR - IMAGE_DEPTH n DEVICE_DEPTH: IMAGE_LEFT_COLOR n IMAGE_RIGHT_COLOR n IMAGE_DEPTH y
DEVICE_ALL: IMAGE_LEFT_COLOR y IMAGE_RIGHT_COLOR - IMAGE_DEPTH y
Could detect image type is enabled after opened through Camera::IsStreamDataEnabled().
Note: y: available, n: unavailable, -: depends on stream_mode
ColorMode color_mode
Color mode, default COLOR_RAW.
DepthMode depth_mode
Depth mode, default DEPTH_COLORFUL.
StreamMode stream_mode
Stream mode of color & depth, default STREAM_1280x720.

StreamFormat color_stream_format
  Stream format of color, default STREAM_YUYV.
StreamFormat depth_stream_format
  Stream format of depth, default STREAM_YUYV.
bool state_ae
  Auto-exposure, default true.
bool state_awb
  Auto-white balance, default true.
std::uint8_t ir_intensity
  IR (Infrared), range [0,10], default 0.
bool ir_depth_only
  IR Depth Only mode, default false.
  Note: When frame rate less than 30fps, IR Depth Only will be not available.
float colour_depth_value
  Colour depth image, default 5000.
  [0, 16384]

StreamInfo

struct StreamInfo
  Stream information.

Public Members

std::int32_t index
  The stream index.
std::int32_t width
  The stream width.
std::int32_t height
  The stream height.
StreamFormat format
  The stream format.

Enums

ErrorCode

enum mynteyed::ErrorCode
  List error codes.
  Values:
  SUCCESS = 0
    Standard code for successful behavior.
  ERROR_FAILURE
    Standard code for unsuccessful behavior.
  ERROR_FILE_OPEN_FAILED
    File cannot be opened for not exist, not a regular file or any other reason.
  ERROR_CAMERA_OPEN_FAILED
    Camera cannot be opened for not plugged or any other reason.
  ERROR_CAMERA_NOT_OPENED
    Camera is not opened now.
  ERROR_CAMERA_RETRIEVE_FAILED
    Camera retrieve the image failed.
  ERROR_IMU_OPEN_FAILED
    Imu cannot be opened for not plugged or any other reason.
  ERROR_IMU_RECV_TIMEOUT
    Imu receive data timeout.
  ERROR_IMU_DATA_ERROR
    Imu receive data error.
  ERROR_CODE_LAST
    Last guard.

Descriptor

enum mynteyed::Descriptor
  The descriptor fields.
  Values:
  DEVICE_NAME
    Device name.
  SERIAL_NUMBER
    Serial number.
  FIRMWARE_VERSION
    Firmware version.
  HARDWARE_VERSION
    Hardware version.
  SPEC_VERSION
    Spec version.
  LENS_TYPE
    Lens type.
  IMU_TYPE
    IMU type.
  NOMINAL_BASELINE
    Nominal baseline.
  DESC_LAST
    Last guard.

ProcessMode

enum mynteyed::ProcessMode
  Process modes.
  Values:
  PROC_NONE = 0
  PROC_IMU_ASSEMBLY = 1
  PROC_IMU_TEMP_DRIFT = 2
  PROC_IMU_ALL = PROC_IMU_ASSEMBLY | PROC_IMU_TEMP_DRIFT

DeviceMode

enum mynteyed::DeviceMode
  List device modes.
  Control the color & depth streams enabled or not.
  Note: y: available, n: unavailable, -: depends on StreamMode
  Values:
  DEVICE_COLOR = 0
    IMAGE_LEFT_COLOR y IMAGE_RIGHT_COLOR - IMAGE_DEPTH n.
  DEVICE_DEPTH = 1
    IMAGE_LEFT_COLOR n IMAGE_RIGHT_COLOR n IMAGE_DEPTH y.
  DEVICE_ALL = 2
    IMAGE_LEFT_COLOR y IMAGE_RIGHT_COLOR - IMAGE_DEPTH y.

ColorMode

enum mynteyed::ColorMode
  List color modes.
  Values:
  COLOR_RAW = 0
    color raw
  COLOR_RECTIFIED = 1
    color rectified
  COLOR_MODE_LAST

DepthMode

enum mynteyed::DepthMode
  List depth modes.
  Values:
  DEPTH_RAW = 0
    ImageFormat::DEPTH_RAW.
  DEPTH_GRAY = 1
    ImageFormat::DEPTH_GRAY_24.
  DEPTH_COLORFUL = 2
    ImageFormat::DEPTH_RGB.
  DEPTH_MODE_LAST

StreamMode

enum mynteyed::StreamMode
  List stream modes.
  Values:
  STREAM_640x480 = 0
    480p, vga, left
  STREAM_1280x480 = 1
    480p, vga, left+right
  STREAM_1280x720 = 2
    720p, hd, left
  STREAM_2560x720 = 3
    720p, hd, left+right
  STREAM_MODE_LAST

StreamFormat

enum mynteyed::StreamFormat
  List stream formats.
  Values:
  STREAM_MJPG = 0
  STREAM_YUYV = 1
  STREAM_FORMAT_LAST

ImageType

enum mynteyed::ImageType
  List image types.
  Values:
  IMAGE_LEFT_COLOR
    LEFT Color.
  IMAGE_RIGHT_COLOR
    RIGHT Color.
  IMAGE_DEPTH
    Depth.
  IMAGE_ALL
    All.

ImageFormat

enum mynteyed::ImageFormat

List image formats.
Values:
IMAGE_BGR_24
  8UC3
IMAGE_RGB_24
  8UC3
IMAGE_GRAY_8
  8UC1
IMAGE_GRAY_16
  16UC1
IMAGE_GRAY_24
  8UC3
IMAGE_YUYV
  8UC2
IMAGE_MJPG
COLOR_BGR = IMAGE_BGR_24
COLOR_RGB = IMAGE_RGB_24
COLOR_YUYV = IMAGE_YUYV
COLOR_MJPG = IMAGE_MJPG
DEPTH_RAW = IMAGE_GRAY_16
DEPTH_GRAY = IMAGE_GRAY_8
DEPTH_GRAY_24 = IMAGE_GRAY_24
DEPTH_BGR = IMAGE_BGR_24
DEPTH_RGB = IMAGE_RGB_24
IMAGE_FORMAT_LAST
  Last guard.

SensorType

enum mynteyed::SensorType
  SensorType types.
  Values:
  SENSOR_TYPE_H22 = 0
  SENSOR_TYPE_OV7740
  SENSOR_TYPE_AR0134
  SENSOR_TYPE_AR0135
  SENSOR_TYPE_OV9714

SensorMode

enum mynteyed::SensorMode
  SensorMode modes.
  Values:
  LEFT = 0
  RIGHT
  ALL

Types

Data

ImgInfo

struct ImgInfo
  Image information.

Public Members

  std::uint16_t frame_id
    Image frame id.
  std::uint32_t timestamp
    Image timestamp.
  std::uint16_t exposure_time
    Image exposure time.

ImuData

struct ImuData
  Imu data.

Public Members

  std::uint8_t flag
    Data type MYNTEYE_IMU_ACCEL: accelerometer MYNTEYE_IMU_GYRO: gyroscope.
  std::uint64_t timestamp
    Imu gyroscope or accelerometer or frame timestamp.
  double temperature
    temperature
  double accel[3]
    Imu accelerometer data for 3-axis: X, Y, X.
  double gyro[3]
    Imu gyroscope data for 3-axis: X, Y, Z.

StreamData

struct StreamData
  Stream data.

Public Members

  std::shared_ptr<Image> img

Image data.
std::shared_ptr<ImgInfo> img_info
Image information.

MotionData

struct MotionData
Motion data.

Public Members

std::shared_ptr<ImuData> imu
ImuData.

Calib

CameraIntrinsics

struct CameraIntrinsics
Camera intrinsics: size, coeffs and camera matrix.

Public Members

std::uint16_t width
The width of the image in pixels.
std::uint16_t height
The height of the image in pixels.
double fx
The focal length of the image plane, as a multiple of pixel width.
double fy
The focal length of the image plane, as a multiple of pixel height.
double cx
The horizontal coordinate of the principal point of the image.
double cy
The vertical coordinate of the principal point of the image.
double coeffs[5]
The distortion coefficients: k1,k2,p1,p2,k3.
double p[12]
3x4 projection matrix in the (rectified) coordinate systems left: fx’ cx’ fy’ cy’ 1 right: fx’ cx’ tx fy’ cy’ 1
double r[9]
3x3 rectification transform (rotation matrix) for the left camera.

StreamIntrinsics

struct StreamIntrinsics
Camera intrinsics: size, coeffs and camera matrix.

ImuIntrinsics

struct ImuIntrinsics
IMU intrinsics: scale, drift and variances.

Public Members

double scale[3][3]
Scale matrix.
Scale X cross axis cross axis cross axis Scale Y cross axis cross axis cross axis Scale Z
double assembly[3][3]
Assembly error [3][3].
double noise[3]
Noise density variances.
double bias[3]
Random walk variances.
double x[2]
Temperature drift.
0 - Constant value 1 - Slope

MotionIntrinsics

struct MotionIntrinsics
Motion intrinsics, including accelerometer and gyroscope.

Public Members

ImuIntrinsics accel
Accelerometer intrinsics.
ImuIntrinsics gyro
Gyroscope intrinsics.

Extrinsics

struct Extrinsics
Extrinsics, represent how the different datas are connected.

Public Functions

Extrinsics Inverse () const
Inverse this extrinsics.
Returnthe inversed extrinsics.

Public Members

double rotation[3][3]
Rotation matrix left camera to right camera.
double translation[3]
Translation vector left camera to right camera.

Utils

select

bool mynteyed::util::select (const Camera &cam, DeviceInfo *info)

print_stream_infos

void mynteyed::util::print_stream_infos (const Camera &cam, const std::int32_t &dev_index)

is_right_color_supported

bool mynteyed::util::is_right_color_supported (const StreamMode &mode)